

MicroVAX 3100 and VAXserver 3100



Owner's Manual

MicroVAX 3100 and VAXserver 3100 Owner's Manual

Order Number. EK-A0371-OM.002

August 1989

This manual describes how to install, test, operate, and maintain MicroVAX 3100 and VAXserver 3100 systems. It also describes how to customize and initiate the operating system software which has been preloaded onto the system disk.

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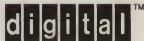
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IMPORTANT!

Destinataires: Tous les acheteurs de RZ55

Objet: Instructions d'installation

Lors de l'installation du boîtier d'extension RZ55, respecter *impérativement* les points suivants :

- la position des commutateurs de configuration de l'interface SCSI doit être conforme aux indications figurant dans le manuel d'installation du système.
- le boîtier d'extension RZ 55 doit être mis sous tension **avant** l'unité centrale.

Pour plus de détails, voir le manuel d'installation du système.

Wichtig — Vor der Installation lesen!

An: Käufer der RZ55-Erweiterungsbox

Betreff: Installationsanleitung

Um die Installation der RZ55-Erweiterungsbox korrekt durchführen zu können, müssen Sie die entsprechende Anleitung in der Dokumentation zu Ihrem System lesen. Beachten Sie bei der Installation **unbedingt folgendes**:

- Die SCSI-Einstellungen müssen korrekt sein. Diese sind in der Installationsanleitung aufgeführt.
- Schalten Sie **zuerst** die RZ55-Erweiterungsbox ein und anschließend das System.

BELANGRIJK! LEES DIT EERST!

AAN: RZ55 klanten

ONDERWERP: RZ55 Installatie-instructies

Voor installatie-instructies raadpleegt u de installatiehandleiding van uw systeem. Vergeet u niet het volgende te doen. Deze handelingen zijn *vereist*:

- de installatiehandleiding raadplegen voor de juiste instelling van uw SCSI-schakelaars.
- de netspanning van uw RZ55 Uitbreidingspakket inschakelen **voordat** u de netspanning van uw systeemkast inschakelt.

Hartelijk dank voor het aanschaffen van het RZ55 Uitbreidingspakket voor uw DIGITAL computer.

VIGTIGT — LÆS FØRST DETTE!

TIL: RZ55 kunder

Instruktioner omkring installation

Vær opmærksom på at du *skal*:

- se i installationsmanualen for rigtig indstilling af SCSI kontakterne.
- tilslutte strøm til RZ55 boksen **før** du tilslutter strøm til systemboksen.

For udførligere instruktioner omkring installationen henvises til systemets installationsmanual.

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IMPORTANT — READ THIS FIRST!

RZ55 Expansion Box
Customer Information Sheet



EK-297AA-IN-001

December 1988

TO: RZ55 Expansion Box Customers

SUBJECT: RZ55 Expansion Box Installation Instructions

For installation instructions, please refer to your system installation manual. Please note that you *must*:

- Refer to the system installation manual for the proper setting of SCSI switches.
- Apply power to the RZ55 expansion box **before** applying power to the system box.

Thank you for purchasing the RZ55 expansion box for **your** DIGITAL computer.

¡ATENCIÓN: LEA LO SIGUIENTE EN PRIMER LUGAR!

A: Compradores de la unidad de ampliación RZ55

ASUNTO: Instrucciones de instalación de la unidad de ampliación RZ55

Consulte el manual de instalación del sistema para más información sobre las instrucciones que deben seguirse. Le rogamos tenga en cuenta que *debe*:

- consultar el manual de instalación del sistema para realizar un correcto ajuste de los conmutadores SCSI.
- conectar la unidad RZ55 a la red **antes de** conectar la unidad del sistema.

Le agradecemos la compra de la unidad de ampliación RZ55 para su ordenador DIGITAL.

IMPORTANTE — LEGGERE PRIMA!

A: Utente RZ55

OGGETTO: Istruzioni per l'installazione RZ55

Per le istruzioni di installazione riferirsi al manuale di installazione del sistema. Si noti che si *deve*:

- fare riferimento al manuale di installazione del sistema per la corretta impostazione degli interruttori SCSI.
- alimentare l'apparato RZ55 **prima** dell'apparato di sistema.

Vi ringraziamo per l'acquisto del modulo di espansione RZ55 per il vostro computer DIGITAL.

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Preface

Purpose of This Manual

This manual describes how to install, test, operate, and maintain MicroVAX 3100 and VAXserver 3100 systems. It also describes how to customize and initiate the operating system software which has been preloaded onto the system disk.

Who Should Use This Manual

This manual is written for people who have little or no previous experience with computers. It is meant to be used by the new owner of a MicroVAX 3100 or VAXserver 3100 for installation, operation, and maintenance.

Structure of This Manual

This manual contains six chapters, eight appendixes and a glossary of technical terms.

- Chapter 1 includes an overview of MicroVAX 3100 and VAXserver 3100 systems, and introduces you to the product features.
- Chapter 2 provides instructions for installing new MicroVAX 3100 or VAXserver 3100 systems. It also describes the operating system software options available.
- Chapter 3 discusses the storage devices (RZ23 hard disk drive, TZ30 tape drive, and RX23 diskette drive) that are optionally an integral part of your system.
- Chapter 4 discusses the add-on storage and software loading devices that can be used with your system.
- Chapter 5 discusses connecting your system to a simple ThinWire daisy-chain work group.
- Chapter 6 provides basic system troubleshooting information.

Appendixes provide complementary information on the following topics:

- Customizing your startup procedures
- SCSI IDs
- Optional hardware that can be added to your system
- System specifications
- Associated documents
- Information on the use and care of storage media
- Backing up the system disk
- Tailoring unwanted VMS files

The glossary explains technical terms used in the manual.

For More Information

See Appendix E for a list of associated documents to help you become acquainted with your new system.

Conventions

The following conventions are used in this guide:

Table 1: Conventions

Convention	Meaning
<code>Ctrl/x</code>	A sequence such as <code>Ctrl/x</code> indicates that you hold down the key labeled Ctrl while you press another key.
<code>Return</code>	A key name is shown enclosed to indicate that you press a key on the keyboard.
UPPERCASE	Uppercase letters indicate that you enter a command (for example, enter SHOW/SET).
<i>Warning</i>	Warnings contain information to prevent personal injury. Read these carefully.
<i>Caution</i>	Cautions provide information to prevent damage to equipment or software. Read these carefully.
<i>Note</i>	Notes provide general information about the current topic.
Bold	Bold type denotes user input in examples.

Chapter 1

Your System

Your system is a member of the MicroVAX 3100 family. This family includes MicroVAX 3100 multiuser (time-sharing) systems and VAXserver 3100 systems. The MicroVAX 3100 family is an entry-level member of DIGITAL's VAX family of computers.

MicroVAX 3100 multiuser systems are general purpose desktop VAX computer systems. They have been designed for use in small business and distributed processing environments. Several users (the number depending on the software license purchased) can access a variety of applications through easy-to-use directly connected terminals.

Your MicroVAX 3100 system is equipped with networking facilities which allow you to create small local work groups or integrate your system (or work group) into a larger network configuration.

VAXserver 3100 systems are desktop servers designed to provide operating system services for dedicated applications or devices.

- You can connect other VAX systems to your VAXserver 3100 to form a networked work group.
- You can connect other devices, for example, PCs or cash registers, to form dedicated application work groups.

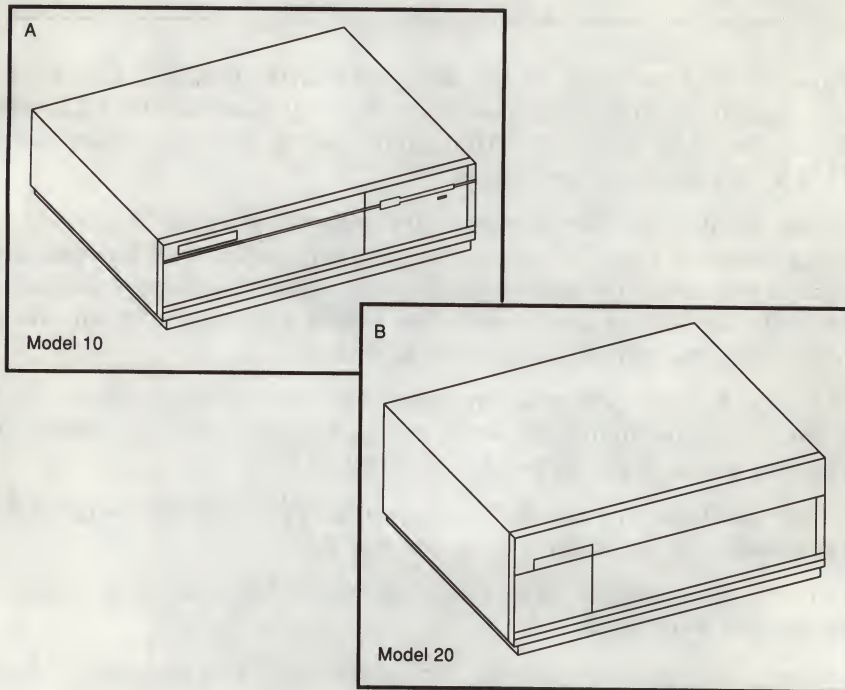
VAXserver 3100 systems support one user, the owner/local system manager.

Two models of the MicroVAX 3100 and VAXserver 3100 system are available: Model 10 and Model 20. The label on the back of the system unit identifies the model type of your system. Model 10 and Model 20 systems are similar, the primary difference being the physical size of the system unit and consequently the number of internal storage options which can be included.

Due to the similarity of the models, illustrations in this manual which depict Model 20 systems are equally applicable to Model 10 systems. Specific differences between Model 10 and Model 20 systems are explained in the text.

Figure 1-1 A shows the system enclosure for MicroVAX 3100 and VAXserver 3100 Model 10 systems and Figure 1-1 B shows the system enclosure for MicroVAX 3100 and VAXserver 3100 Model 20 systems.

Figure 1-1: MicroVAX 3100 and VAXserver 3100 System Enclosures



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1.1 System Highlights

Your MicroVAX 3100 or VAXserver 3100 system has many special features as described in the following list:

- **Memory**—Your system can be expanded to include up to 32 megabytes (Mb) of internal random access memory (RAM).
- **TZ30 Tape Drive**—Your TZ30 tape drive, if fitted, stores up to 95Mb of data per tape cartridge. The TZ30 is compact enough to fit neatly into the system enclosure with the other devices.

- ThinWire and standard Ethernet connectability—Connection to either standard Ethernet or ThinWire Ethernet work groups and networks is available, but not both simultaneously.
- RZ23 Disk Storage—In Model 10 systems, up to three RZ23 (104Mb) hard disk drives may be included while in Model 20 systems, up to five RZ23 hard disk drives can be included. One of the RZ23 hard disk drives functions as the system disk.
- Two operating systems to choose from—VAX/VMS or ULTRIX-32 (Digital Equipment Corporation's version of the UNIX operating system). Operating system software may be factory installed on the system disk or may be purchased separately from the hardware.
- RX23 Diskette Drives—Model 10 systems can be configured with one RX23 (1.4Mb) diskette drive while Model 20 systems can be configured with one or two RX23 diskette drives.
- Self-sensing power supply—The system power supply will accept power inputs in the ranges 100/120 VAC and 200/240 VAC, at 50 or 60 Hertz, without the need for a selection switch.
- Communication ports—Three DEC423 asynchronous ports (with MMJ connectors for VTxxx type terminals) and one MODEM port (RS232) are provided as standard. A H8571-A adapter is provided to enable the RS232 port to be used with many cable types.

The maximum baud rate for all four serial ports is preset to 19.2 Kbaud but can be changed to 19.8 Kbaud (or 38.4 Kbaud) by repositioning jumper wires on the system module. This conversion will be done by your authorized DIGITAL service representative. The actual baud rate for the serial ports is software programmable.

- Optional DSH32-B communications module—The optional DSH32-B communications module (included in some configurations) adds eight asynchronous lines and one synchronous line to your system. There are three different types. The type is determined by the electrical interface of the synchronous port. See Table 1-1 for a list of the models.

Table 1-1: DSH32-B Models

Model	Synchronous Port Electrical Interface
DSH32-BA	RS232
DSH32-BB	RS423
DSH32-BC	RS422

The eight asynchronous lines are available as eight MMJ ports via a H3104 cable concentrator and 36-pin asynchronous cable supplied with the DSH32-B communications module.

- SCSI connectability—Small Computer Systems Interconnect (SCSI) is an industry standard for connecting mass storage devices.
- Add-on Storage Devices—Table 1-2 shows the external expansion boxes which can be purchased to provide extra storage capability.

Table 1-2: Optional Expansion Boxes

Model	Description	Capacity
RRD40	Compact disc drive	600Mb
RZ55	Hard disk drive	332Mb
TK50Z	Tape drive	95Mb

1.2 System Configurations

The range of options available to MicroVAX 3100 and VAXserver 3100 systems provide many different system configurations. These configurations are divided into two main categories, packaged systems and base systems. The configuration categories are defined as follows:

- Packaged systems are predefined system configurations. Additional factory integrated options ordered by the prospective Owner must be installed by Field Service personnel.
- Base systems are minimum system configurations which the Owner can enhance by selecting desired options when ordering. These options are installed in the factory.

Chapter 2

Installing Your System

Setting up your MicroVAX 3100 or VAXserver 3100 system is easy. After helping you check that you have all your equipment (see Section 2.2), this chapter describes:

- Setting up your system unit
- Attaching Ethernet terminators to prepare for networking or diagnostic tests
- Connecting a terminal
- Connecting the power cord
- Starting your system

The chapter goes on to show you everything you need to do to get your system up and running, including:

- What to do if you're planning to connect to a network
- The operating system software and the options available
- Booting your system from the system disk
- Using VMS Factory Installed Software (FIS)
- Connecting additional terminals

2.1 Choosing the Right Location

Use the following checklist to keep your system operating at its best:

- Carefully read all installation instructions before you turn on the power.
- Keep the temperature between 10° and 32°C (50° and 90°F) if your system has a TZ30 tape drive installed. If the system does not have a TZ30 installed, keep the temperature between 10° and 40°C (50° and 104°F).
- Keep the relative humidity between 40% and 80% if your system has a TZ30 tape drive installed. Tape cartridges should also be stored at this

relative humidity. If the system does not have a TZ30 installed, keep the relative humidity between 10% and 90%.

- Keep the air well circulated to prevent excess heat and dust from accumulating.
- Keep your equipment away from heaters, photocopiers, direct sunlight, and abrasive particles.
- Before you set up your system, select a surface that is large enough to hold the system unit. Your desk or work table is a good choice.
- Keep the area clean. Do not place food or liquid on or near your equipment, and do not place your system unit directly on the floor. Dust and dirt will damage the system components.
- Keep air vents clear on each side of the system unit for proper ventilation.
- Do not place the system unit on its side. Blocking the air vents can cause the system unit to overheat.
- Connect your system to a dedicated grounded circuit.

If you have several pieces of equipment that need to be plugged into an electrical outlet, use a grounded power strip. Many power strips come with an on/off switch and a surge protector.

Do not exceed the voltage requirement of the circuit.

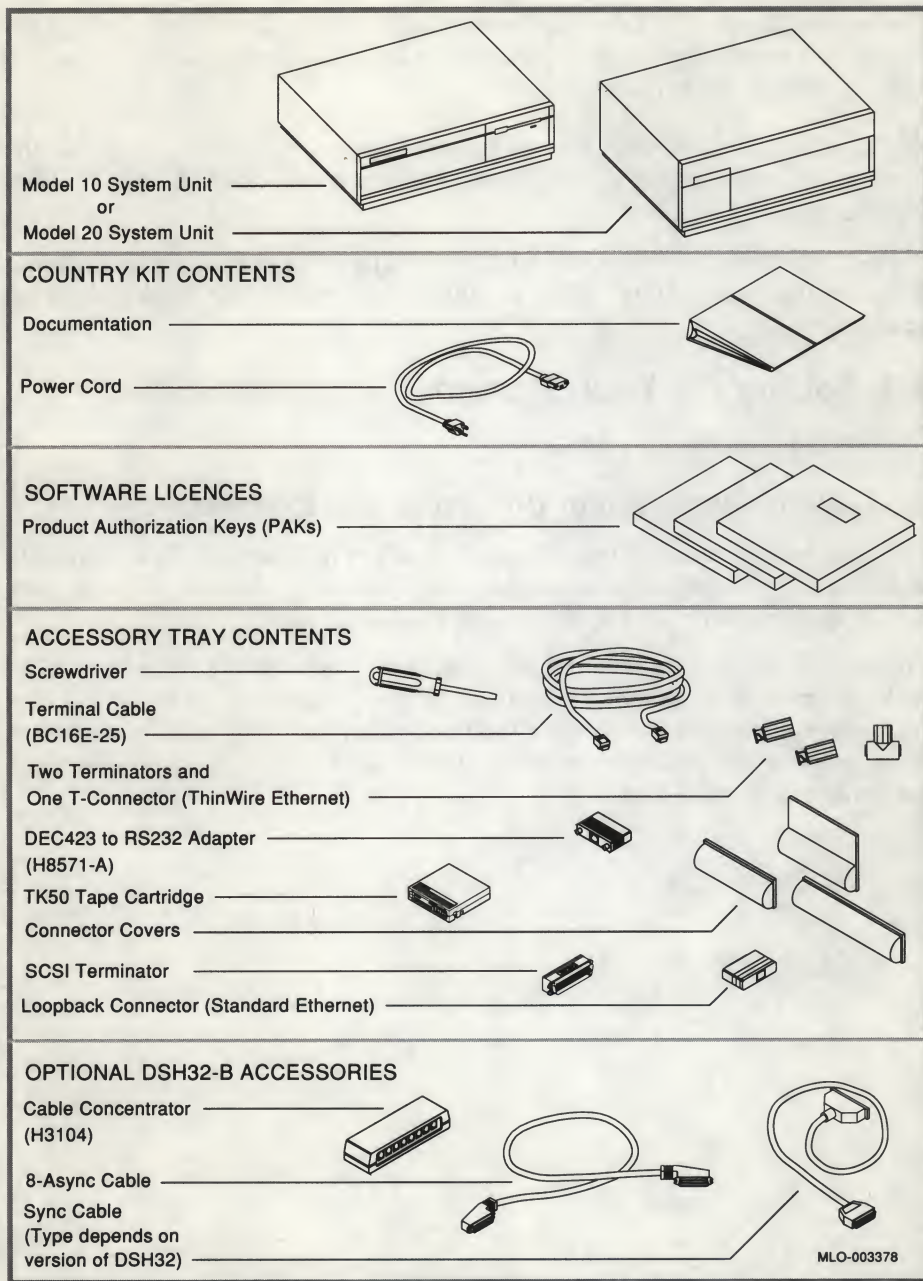
- To avoid damaging equipment that has been moved inside from a cold environment, let the equipment warm to room temperature before you turn it on. Let tape cartridges stabilize for 24 hours.

2.2 Unpacking

CAUTION: *Because of the weight of the system unit, two people should lift the equipment out of the shipping carton and place it on a work surface.*

The shipping carton contains three boxes and an accessory tray. The large box under the accessory tray contains the system unit. The other two boxes contain the country kit and the software licenses respectively. Figure 2-1 shows the contents of each box. When unpacking the boxes keep the contents of each box separate from the others. Expansion boxes are packed in separate cartons (see Section 4.3).

Figure 2-1: Unpacking Your System



NOTE: *Some systems shipped within the United States include a VT320-AA console terminal.*

The contents of the shipping carton may differ from that shown in Figure 2-1 depending on what you order. Check the contents of the shipping carton against the shipping list.

NOTE: *Depending on how you set up your system, you may not use all the components supplied with your system. Unused parts should be stored safely for future use.*

Always repack the system unit in its original packing material when moving or relocating your system. This precaution will protect the hard disks from damage.

2.3 Setting Up Your System

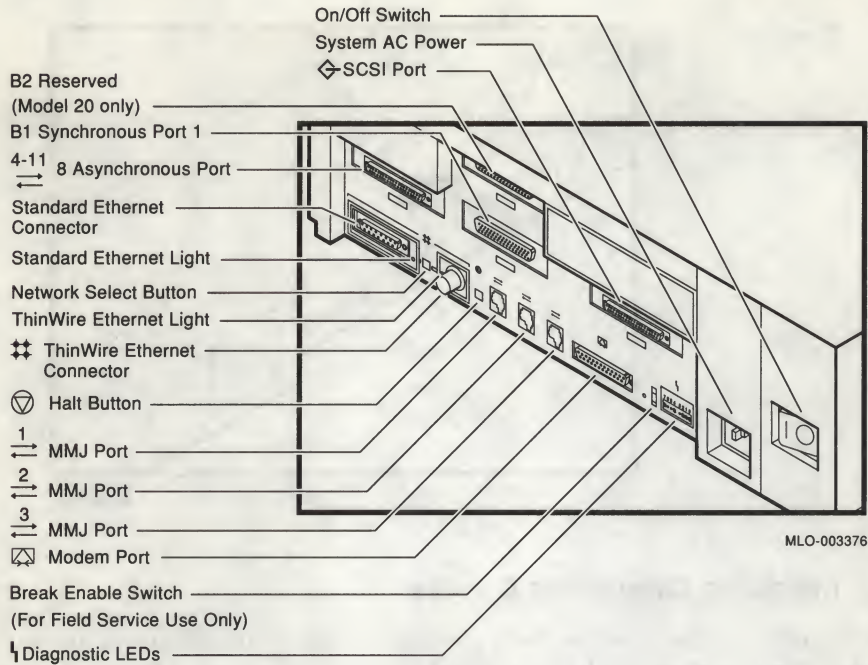
You are ready to set up your system.

2.3.1 Identifying System Unit Ports and Connectors

Turn the system unit around so that the back of it faces you. Take a minute to look at all the ports and connectors. Symbols (called icons) identify each port and connector you will need to install your system.

Figure 2-2 shows the ports and connectors on the back of a MicroVAX 3100 or VAXserver 3100 Model 20 system. The arrangement of the ports and connectors on Model 10 systems is almost identical; the only difference is the absence of the B2 Reserved connector on the top level due to the reduced height of the system enclosure.

Figure 2-2: Ports and Connectors

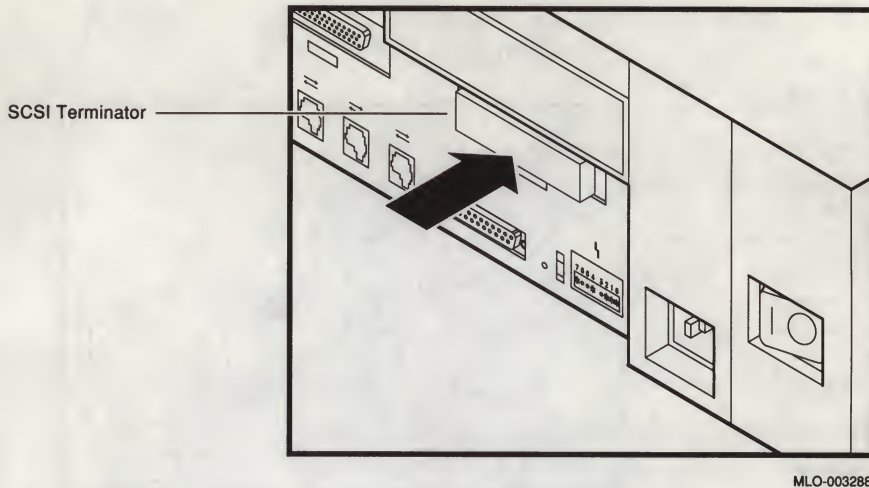


NOTE: Figure 2-2 shows a fully configured MicroVAX 3100 or VAXserver 3100 Model 20 system.

2.3.2 Installing the SCSI Terminator

If you do not intend to connect expansion boxes to your system, install the SCSI terminator (see Figure 2-1) on the SCSI port on the back of the system unit as shown in Figure 2-3.

Figure 2-3: Installing the SCSI Terminator



2.3.3 Installing Connector Covers

Three connector covers have been provided with your system to protect the unused connectors on the rear panel of the system unit. After you have identified the ports and connectors, you should install covers on the unused connectors as determined by your system configuration.

Determine if the optional DSH32-B communications module is included in your system. If this module is not included, install cover 1 and cover 2 as shown in Figure 2-4 A.

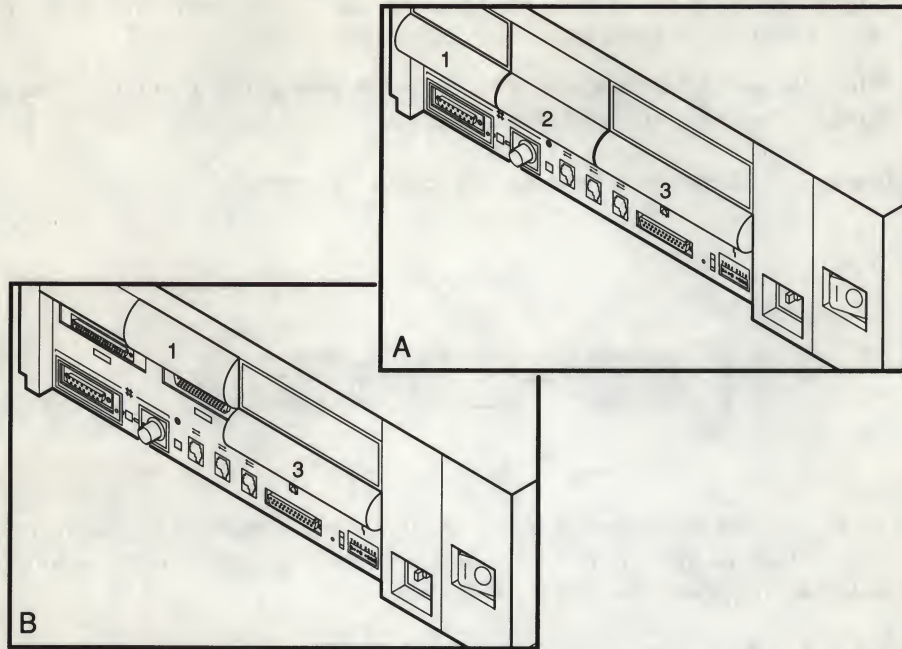
NOTE: *Due to the construction of the covers, cover 2 must be installed first.*

NOTE: *On Model 10 systems, cover 2 is slightly different than the one shown in Figure 2-4 A, that is, it does not contain the flat portion which conceals the B2 Reserved connector on Model 20 systems.*

If the DSH32-B communications module is included in your system, install cover 1 as shown in Figure 2-4 B.

If you do not wish to use the external SCSI interface, install cover 3 over the SCSI terminator as shown in Figure 2-4 A and B.

Figure 2-4: Installing Connector Covers



MLO-002967

2.3.4 Attaching Ethernet Terminators

You need to connect the T-connector, two Ethernet terminators, and the loopback connector (see Figure 2-1), to the system unit to successfully complete the diagnostic tests later in this chapter.

NOTE: *The system will not boot if an Ethernet error is detected during power-up self-test.*

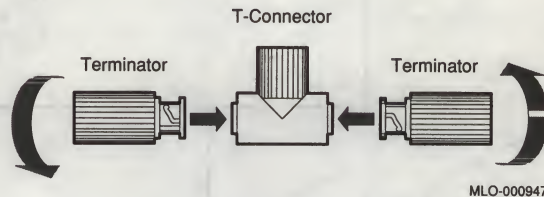
The T-connector is used with two terminators to complete the ThinWire Ethernet circuit for diagnostic purposes. Later, if you decide to connect to a network, you exchange ThinWire cable sections for one or both terminators, depending on your network setup.

The loopback connector, by itself, completes the standard Ethernet circuit for diagnostic purposes.

To connect the two terminators to the T-connector:

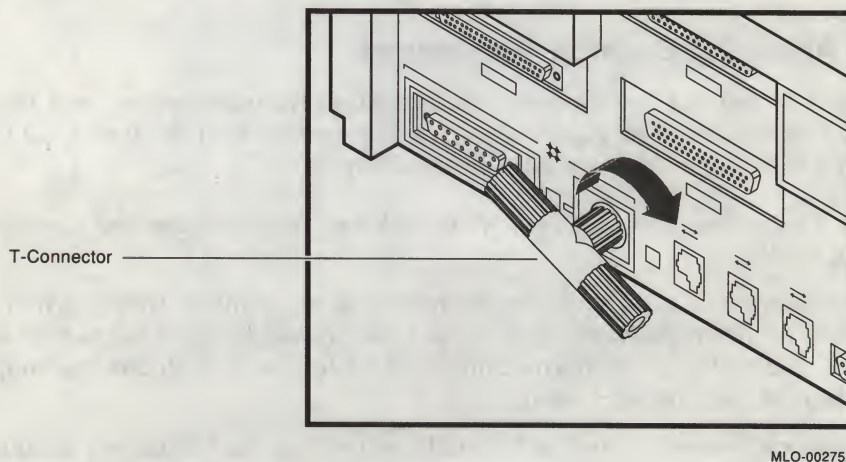
1. Push one terminator into one side of the T-connector and turn it clockwise until it locks into place. See Figure 2-5.
2. Push the second terminator into the other side of the T-connector and turn it clockwise until it locks into place.

Figure 2-5: Connecting Terminators to the T-Connector



3. Next, connect the T-connector to the ThinWire Ethernet connector on the back of the system unit, turning the barrel connector clockwise until it locks into place. See Figure 2-6.

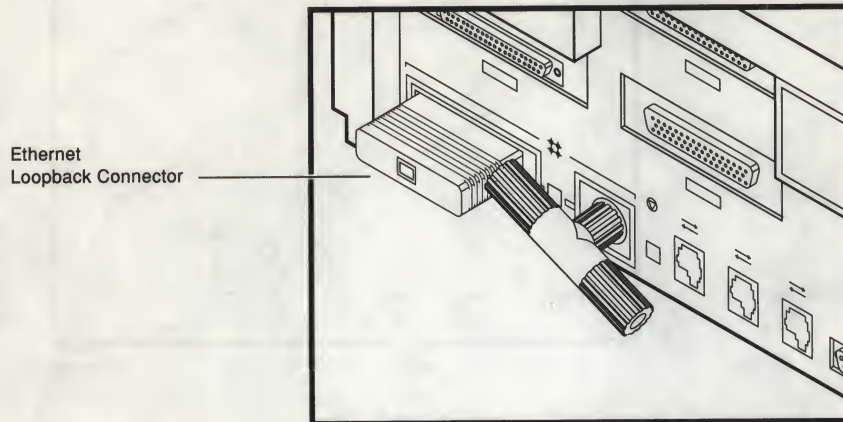
Figure 2-6: Connecting the T-Connector to the System Unit



4. Connect the loopback connector to the standard Ethernet connector on the back of the system unit, as shown in Figure 2-7.

5. Rotate the T-connector slightly to make room for the loopback connector if necessary.

Figure 2-7: Connecting the Loopback Connector to the System Unit



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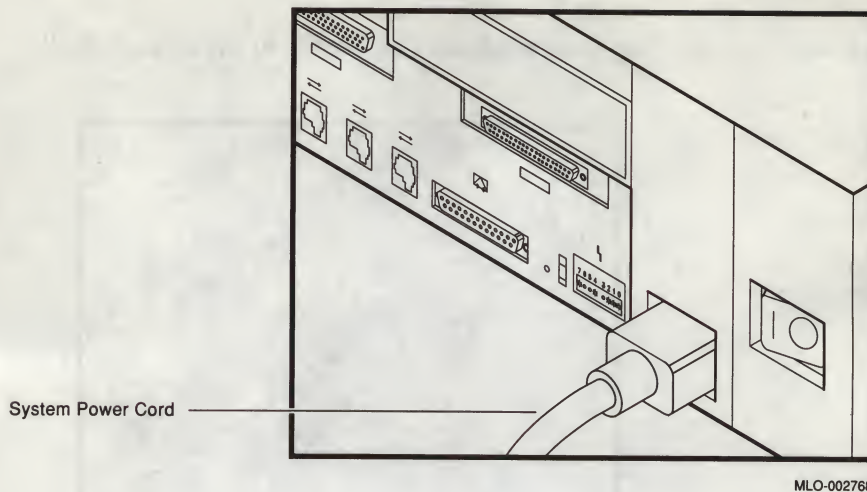
2.3.5 Connecting the System Unit Power Cord

NOTE: Make sure that the power *ON/OFF* switch on the rear panel of the system unit is in the *OFF* position.

The system will accept power inputs in the ranges 100/120 VAC and 200/240 VAC at 50 or 60 Hertz. Within these limits the power supply is self-sensing and no selection or switching is required.

Connect the power cord supplied to the power socket on the rear panel of the system unit as shown in Figure 2-8. Connect the other end of the power cord to a grounded power outlet.

Figure 2-8: Connecting the Power Cord



2.3.6 Connecting a Terminal

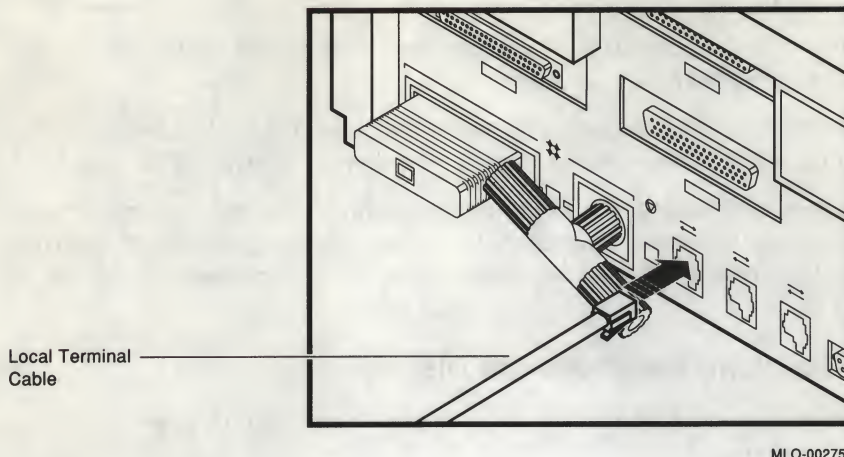
NOTE: *Make sure that the power ON/OFF switch on the terminal is in the OFF position.*

The terminal must be set at 9600 baud, with 8 bits, and no parity. See your terminal documentation if you need information on setting up your terminal.

NOTE: *If you connect the terminal cable to one of the MMJ ports on the rear of a VT3xx terminal, you must set the port for DEC-423 operation. See your terminal documentation for details.*

Connect the terminal cable supplied with the system (see Figure 2-1) to MMJ port 1 on the rear panel of the system unit as shown in Figure 2-9. Connect the other end of the console cable to the communications port on the terminal.

Figure 2-9: Connecting a Terminal



2.3.7 Connecting Expansion Boxes

If you have received any expansion boxes with your system, you should now connect them to your system unit. See Chapter 4 for information on connecting expansion boxes.

2.3.8 Connecting Optional Equipment

If you have received any optional equipment with your system, for example printers or modems, you should now connect them to your system unit. See Appendix C for information on connecting optional equipment.

2.4 Starting Your System

To start your system:

1. Turn on any RZ55 hard disk expansion boxes (if connected) by setting their power switches to 1 (on).
2. Turn on any other expansion boxes connected to your system.
3. Turn on any optional equipment (for example, printers or modems).
4. Turn on the console terminal connected to MMJ port 1 (see your terminal documentation).

NOTE: Allow time for the console terminal to complete its power-up sequence, otherwise you will not be able to view the system power-up self-test display.

5. Turn on the system unit by setting the on/off switch on the back of the system unit to the on position.

It will take approximately one and a half minutes for the initial power-up display to appear. An example of the display is given in Section 2.4.1.

6. Define the system default boot device, default recovery action, network listener, and remote trigger state, as required. Appendix A describes the full range of possible definitions. An example is given in Section 2.4.1.

2.4.1 Checking the Power-Up Display

When you turn on the system unit, a power-up display appears on the terminal screen.

If you see a display similar to the following, your system has passed all power-up tests, the keyboard language of the terminal has been set, and the system is waiting for a boot device name to be entered (with the network as the default boot device if no name is entered after a time-out period):

```
KA41-A V1.3
F...E...D...C...B...A...9...8...7...6...5...4...3...2...1...
? E 0040 0000.0005
? D 0050 0000.0005
? C 0080 0000.4001
? 6 80A1 0000.4001

VMS/VMB  ULTRIX  ADDR  DEVTYP  NUMBYTES  RM/FX  WP  DEVNAM
-----  -
ESA0      SE0     08-00-2B-0C-5B-FB
DKA300    RZ23     A/3/0/00  DISK      104 MB   FX      RZ23
MKA500    TZ50     A/5/0/00  TAPE      .....   RM
...HostID...  A/6      INTR
DKB400    RZ12     B/4/0/00  RODISK     593 MB   RM      WP  RRD40
...HostID...  B/6      INTR

[ESA0:] ?>>>
```

It is necessary to halt the system and set up default boot device name, default recovery action, network listener and remote trigger state, before booting the system for the first time. To do this:

1. Press the HALT button on the back of the system unit as shown in Figure 2-2. The system displays the console prompt (>>>) on a new line.

2. Set the system default boot device. To use the system with VMS Factory Installed Software (FIS), enter:

```
>>> SET BOOT DKA300 
```

See Appendix A for other possible settings.

3. Set the system default recovery action. To use the system with VMS FIS, enter:

```
>>> SET HALT 3 
```

See Appendix A for other possible settings.

4. Set the system network listener and remote trigger state. To use the system with VMS FIS, enter:

```
>>> SET MOP 0 
```

```
>>> SET TRIG 0 
```

This disables the network listener and remote systems request.

5. Check the settings you have just input:

To show the default boot device name, enter:

```
>>> SHOW BOOT 
```

Check that the data returned is the same as that entered in step 2.

To show the default recovery action, enter:

```
>>> SHOW HALT 
```

Check that the value returned is the same as that entered in step 3.

To show the default network listener and remote systems request settings, enter:

```
>>> SHOW MOP 
```

```
>>> SHOW TRIG 
```

Check that the values returned are the same as those entered in step 4.

If any of the values are incorrect, repeat the operation.

6. Boot the system by entering:

```
>>> BOOT DKA300 Return
```

NOTE: *DKA300 is the system disk name. You may wish to enter a different name to boot the system from an alternative source.*

2.4.2 If You Have Problems

If you do not see the power-up display or have difficulty in entering any of the system default settings, turn off the system unit and review each installation step. Repeat the power-up procedure. See Chapter 6, Handling Problems, if the problem persists.

NOTE: *Check the position of the BREAK ENABLE switch. See Figure 2-2. It should be in the down position.*

2.5 Connecting to a Network

If you are connecting your system to a network, read Chapter 5 and install your network hardware before you boot your system.

2.6 The Operating System

Depending on your requirements and your order, the operating system may or may not be supplied. For instance, if you intend to use the system as a diskless member of a work group, using the resources of another system in the group, you will not need another operating system.

NOTE: *If you are not familiar with VMS, see the VMS manuals supplied when you order the VMS distribution and documentation kit.*

If you have a PCLAN/Server VMS 3100 system, refer to the *PCLAN/ Server VMS 3100 Installation Guide* for information concerning operating system installation.

In most cases operating system software is supplied with the system. It is preloaded onto the system disk at the factory. You can boot your system from the operating system software on the system disk.

However, you may choose to boot the system from an alternative source. Appendix A describes how to set up the system to boot automatically from an alternative device, that is, a device other than the system disk. If your system is part of an Ethernet Local Area Network, you can use the

Remote System Manager (RSM) to boot your operating system and install application software.

2.7 Using VMS Factory Installed Software

When the system is first switched on, or is restarted after being powered down for some time, a power up display similar to the following appears on the screen:

```
KA41-A V1.3
F_..E...D...C...B...A...9...8...7...6...5...4...3...2...1...
? E 0040 0000.0005
? D 0050 0000.0005
? C 0080 0000.4001
? 6 80A1 0000.4001

VMS/VMB  ULTRIX      ADDR      DEVTYP  NUMBYTES  RM/FX  WP  DEVNAM
-----  -
ESA0      SE0        08-00-2B-0C-5B-FB

DKA300    RZ23        A/3/0/00  DISK      104 MB   FX           RZ23
MKA500    TZ50        A/5/0/00  TAPE      .....   RM
...HostID...  A/6        INTR

DKB400    RZ12        B/4/0/00  RODISK    593 MB   RM      WP  RRD40
...HostID...  B/6        INTR

[ESA0:]  ?>>>
```

If this display (ending with the [ESA0:] ?>>> prompt) appears, then see section 2.4 to set up the system default settings before continuing.

This section goes on to describe starting VMS Factory Installed Software (FIS) for the first time, using commands entered at the console terminal.

Appendix A describes alternative settings for system defaults. The system can be set to start VMS FIS automatically, when the system unit is powered on, provided that this default setting is retained in the system's battery-backed memory. Default settings are retained when the batteries are fully charges (after the system has been powered-on for 17 hours), and are retained for around four days. If lost, default settings can be reentered as described in Section 2.4.1.

If the system is using the stored system default settings described in Section 2.4 for use with FIS, a display similar to the following will appear:

KA41-A V1.3

F_..E...D...C...B...A...9...8...7...6...5...4...3...2_..1...

? C 0080 0000.4001

? 6 80A1 0000.4001

>>>

Enter the following command and press RETURN to boot the system from the operating software on the system disk:

>>> **BOOT DKA300**

The system displays a status message similar to the following:

VAX/VMS Version V5.2-1 Major version id = 1 Minor version id = 0

If the system clock has to be reset, the system prompts:

PLEASE ENTER TIME AND DATE (DD-MMM-YYYY HH:MM)

Enter the date and time, for example

2-JUNE-1989 14:20

The system then continues as follows:

=====
Modifying factory-installed software for customer use

Messages are displayed about the license database - license information should be entered later. The following messages appear on the screen:

Startup processing continuing...

Configuring all devices on the system

Do you want to enter Customer's cluster and password information (Y/N)? **Y**

FIS must be modified to accommodate customized passwords and system environment particulars. The requirements for modifying FIS are dependent on how the system is to be used. The three different ways in which the system can be used are as follows:

- As a standalone system
- As a cluster server
- As a member of a larger cluster

The requirements for modifying FIS in all these cases are described in the sub-sections following.

2.7.1 Modifying FIS for Standalone Systems

If you intend to use your system as a standalone system, enter responses to the prompts displayed as follows:

Do you want to enter Customer's cluster and password information (Y/N)? **Y**

Will this node be a cluster member (Y/N)? **N**

Enter account passwords and press RETURN in response to the system prompts as follows:

NOTE: *The passwords shown here are sample passwords. You should enter your own unique passwords.*

Enter new password for account SYSTEM: **PANCAKES**
Reenter the password for account SYSTEM: **PANCAKES**
%UAF-I-MDFYMSG, user record(s) updated

Enter new password for account SYSTEST: **BRATHWURST**
Reenter the password for account SYSTEST: **BRATHWURST**
%UAF-I-MDFYMSG, user record(s) updated

Enter new password for account FIELD: **ZIRHUMBA**
Reenter the password for account FIELD: **ZIRHUMBA**
%UAF-I-MDFYMSG, user record(s) updated

The procedure verifies the passwords. Passwords which can be easily guessed are rejected. If the passwords are acceptable, the following status messages are displayed:

%VMS-I-PWD_OKAY, account password for SYSTEM verified
%VMS-I-PWD_OKAY, account password for SYSTEST verified
%VMS-I-PWD_OKAY, account password for FIELD verified

The following status message is then displayed:

Creating RIGHTS database file, SYS\$SYSTEM:RIGHTSLIST.DAT

Ignore any messages of the following type:

%SYSTEM-F-DUPIDENT, duplicate identifier

When the procedure is completed, the following status is displayed:

%UAF-I-RDBDONEMSG, rights database modified

The system then reboots automatically to complete the configuration changes. If the system default boot device name is incorrectly set, the system may fail to reboot. In this case, use the system HALT button (see

Figure 2-2) to halt the system and set up the system default settings (see Section 2.4). Then reboot the system using the command:

```
>>> BOOT DKA300 
```

After the system has rebooted, status information is displayed as follows:

Startup processing continuing...

```
%SET-I-INTEST, login interactive limit=64, current interactive value=0
SYSTEM          Job terminated at 31-DEC-1988 15:00:00.00
```

Accounting information:

Buffered I/O count:	133	Peak working set size:	401
Direct I/O count:	12	Peak virtual size:	2379
Page faults:	325	Mounted volumes:	0
Charged CPU time:	0 00:00:55.23	Elapsed time:	0 00:01:31.24

At this point, the VMS operating system is running. However, you must perform certain post installation tasks before you can use the system. Press RETURN and the system asks you for a user name and password. Log in to the SYSTEM account as follows:

Welcome to VAX/VMS

```
USERNAME: SYSTEM 
```

```
PASSWORD: PANCAKES 
```

```
%LICENSE-I-NOLICENSE, no license is active for this software product
```

```
%LOGIN-LOGOPRCON, login allowed from OPA0:
Welcome to VAX/VMS
```

Always know your password. If you do not enter the correct password, the system displays the following message:

User authorization failure

If you forget your password, follow the instructions for breaking into the system in the *Guide to Setting Up a VMS System*.

You should now perform the following operations:

- Register any Product Authorization Keys (PAKs) that you have received with your system.
- Backup the system disk.
- Delete unwanted VMS files.

To register PAKs, enter the following:

\$ @SYS\$UPDATE:VMSLICENSE

NOTE: *Care should be taken to ensure that the information (as read from the PAK) is entered correctly.*

If you make a mistake while entering any PAK, continue the data entry sequence and reject the entered data at the end of the sequence when the system asks you to confirm that the data entered is correct. The system then gives you the opportunity to reenter the data correctly.

NOTE: *Care should be taken when reentering data to ensure that the PAK data is entered correctly.*

See the *VMS License Management Utility Manual* for any additional information you may need.

Appendix G and Appendix H provide information on backing up the system disk and tailoring VMS files respectively. Read this information carefully and decide the exact sequence of backup and tailoring functions necessary, based on the amount of tailoring required (if any) and the backup resources available to you.

See the *VMS Installation and Operations Manual* for further information on entering Program Authorization Keys (PAKs), customizing and testing the system, startup and shutdown, and backup procedures.

2.7.2 Modifying FIS for a Cluster Server

If you intend to use your system as a cluster server, you will require a node name and a node ID which can be obtained from your Network Coordinator. Then, respond to the system prompts as follows:

Do you want to enter Customer's cluster and password information (Y/N)? **Y**

Will this node be a cluster member (Y/N)? **Y**

A series of system prompts are then displayed. Respond to the system prompts as indicated in Table 2-1.

Table 2–1: System Prompts for Local Area and Mixed-Interconnect Configurations

System Prompt	How to Respond
What is the node's DECnet node name?	Enter DECnet node name, for example, JUPITR. The DECnet node name may be from 1 to 6 alphanumeric characters in length and may not include dollar signs or underscores.
What is the node's DECnet node ID?	Enter DECnet node ID, for example, 2.2.
Will the Ethernet be used for cluster communications (Y/N)?	Enter Y. The Ethernet is required for cluster (SCS internode) communications in local area and mixed-interconnect configurations.
Enter this cluster's group number:	Enter a number in one of the ranges, 1 to 4095 or 61440 to 65535. You can obtain this number from your Network Coordinator.
Enter the cluster's password:	Enter the cluster password which must be from 1 to 31 alphanumeric characters in length and may include dollar signs and underscores. You can obtain the cluster's password from your Network Coordinator.
Reenter the cluster's password for verification:	Reenter the password.
Will JUPITR be a disk server (Y/N)?	Enter Y. In local area and mixed-interconnect configurations, the system disk is always served to the cluster. See the <i>VMS VAXcluster Manual</i> on served cluster disks.
Will JUPITR serve HSC disks (Y)?	Enter N.
Enter a value for JUPITR's ALLOCLASS parameter:	Enter 0.
Does this cluster contain a quorum disk (Y/N)?	Enter N.

The system prompts for account passwords as in Section 2.7.1. The system then reboots automatically to complete the configuration changes. If the system default boot device name is incorrectly set, the system may fail to reboot. In this case, use the system HALT button (see Figure 2–2) to halt

the system and set up the system default settings (see Section 2.4). Then reboot the system using the command:

```
>>> BOOT DKA300 
```

After the system has rebooted, status information is displayed as follows:

Startup processing continuing...

```
%SET-I-INTEST, login interactive limit=64, current interactive value=0
SYSTEM          Job terminated at 31-DEC-1988 15:00:00.00
```

Accounting information:

Buffered I/O count:	133	Peak working set size:	401
Direct I/O count:	12	Peak virtual size:	2379
Page faults:	325	Mounted volumes:	0
Charged CPU time:	0 00:00:55.23	Elapsed time:	0 00:01:31.24

At this point, the VMS operating system is running. However, you must perform certain post-installation tasks before you can use the system. Press RETURN and the system asks you for a user name and password. Log in to the SYSTEM account as follows:

Welcome to VAX/VMS

```
USERNAME: SYSTEM 
```

```
PASSWORD: PANCAKES 
```

```
%LICENSE-I-NOLICENSE, no license is active for this software product
```

```
%LOGIN-LOGOPRCON, login allowed from OPA0:
Welcome to VAX/VMS
```

If you do not enter the correct password, the system displays the following message:

User authorization failure

If you forget your password, follow the instructions for breaking into the system in the *Guide to Setting Up a VMS System*.

You should then perform the following operations:

- Register any Product Authorization Keys (PAKs) that you have received with your system.
- Backup the system disk.
- Delete unwanted VMS files.

To register PAKs, enter the following command:

\$ @SYS\$UPDATE:VMSLICENSE

NOTE: *Care should be taken to ensure that the information (as read from the PAK) is entered correctly.*

If you make a mistake while entering any PAK, continue the data entry sequence and reject the entered data at the end of the sequence when the system asks you to confirm that the data entered is correct. The system then gives you the opportunity to reenter the data correctly.

NOTE: *Care should be taken when reentering data to ensure that the PAK data is entered correctly.*

See the *VMS License Management Utility Manual* for any additional information you may need.

Appendix G and Appendix H provide information on backing up the system disk and tailoring VMS files respectively. Read this information carefully and decide the exact sequence of backup and tailoring functions necessary, based on the amount of tailoring required (if any) and the backup resources available to you.

See the *VMS Installation and Operations Manual* for further information on entering Program Authorization Keys (PAKs), customizing and testing the system, startup and shutdown, and backup procedures.

2.7.3 Modifying FIS for a System in a Larger Cluster

If you intend to configure your system in a larger cluster, see the *VMS VAXcluster Manual* supplied with your software documentation for detailed information.

2.8 Installing Operating System Software

If you need to install your operating system or if you are upgrading your operating system, you will need to have one of the following:

- TZ30 tape drive
- Connection to a network to load the software from another system
- RRD40 compact disc expansion box
- TK50Z tape drive expansion box

To set your system up to automatically start operating system software from a particular device, see Appendix A.

Install any expansion boxes before you install your software. See Chapter 4 for additional information.

To install the VMS or ULTRIX operating system software on a MicroVAX 3100 or VAXserver 3100 system, follow the operating system software installation instructions that are shipped with the software. During software installation, the operating system software is transferred from the installation media (tape or compact disc) to a hard disk in the system or to an expansion box connected to your system.

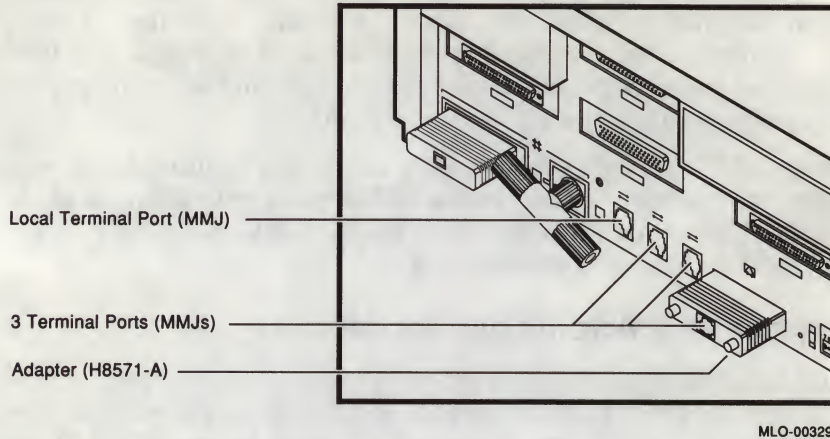
If your MicroVAX 3100 or VAXserver 3100 is network connected, you may be accessing the operating system from a VAXserver. For information about accessing the VMS or ULTRIX operating system software on your server, see your operating system documentation.

2.9 Connecting Additional Terminals

Three additional terminals can be connected to the system unit. These terminals are connected to MMJ ports 2 and 3, and to the modem port. A H8571-A adapter is required to convert the modem port 25-pin D-sub connector to an MMJ connector before a terminal can be connected. Figure 2-10 shows the ports to which these terminals are connected and the H8571-A adapter.

CAUTION: *If you use an adapter to convert the MODEM port to an MMJ terminal port, the recommended maximum cable length is 50 ft.*

Figure 2-10: Connecting Additional Terminals to a MicroVAX 3100 or VAXserver 3100 System



If the optional DSH32-B communications module is installed, a further eight terminals can be connected to the system. See Section C.2.1.1 for information on connecting these terminals.

VAXserver 3100 systems support only one user. A terminal is normally connected to MMJ port 1. However, other terminals may be connected to MMJ ports 2, or 3, or to the “modem” port (if the adapter is used).

2.10 How to Turn Off Your System

Follow the shutdown instructions in your operating system software documentation. After completing the system shutdown, turn off your equipment in the following order:

1. Terminals
2. Optional equipment, such as printers or modems
3. Expansion boxes
4. System unit

Chapter 3

Learning About Your System

This chapter provides information about the various devices mounted within the Model 10 and Model 20 system enclosures.

3.1 Storage Devices

MicroVAX 3100 and VAXserver 3100 systems use the following internal storage devices:

- RZ23 hard disk
- TZ30 tape drive
- RX23 diskette drive

In Model 10 systems, these devices are installed on a drive mounting panel within the system enclosure. Depending on your system configuration, your system may contain these devices in the combinations listed in Table 3-1.

Table 3-1: Model 10 Internal Storage Device Combinations

Drive Mounting Panel	
Left Compartment ¹	Right Compartment
RZ23	TZ30
One or two RZ23s	RX23
One or two RZ23s	RZ23

¹If only one RZ23 hard disk drive is installed in the left compartment, it is mounted in parallel with the device in the right compartment. If two RZ23s are installed, they are mounted side by side and at right angles to the device in the right compartment.

In Model 20 systems, these devices are installed on the upper and lower drive mounting panels within the system enclosure. Depending on the configuration, your system may contain storage devices in the combinations listed in Table 3-2.

Table 3-2: Model 20 Internal Storage Device Combinations

MOUNTING PANEL		POSITION	
Upper	Left	Center	Right
			RZ23
		RZ23	RZ23
	RZ23	RZ23	RZ23
Lower	Left		Right
	RZ23		TZ30
	RX23		TZ30
	RZ23		RX23
	RX23		RX23
	RZ23		RZ23

3.1.1 RZ23 Hard Disk

A hard disk stores information on a nonremovable disk. In Model 10 systems, you can have up to three RZ23 hard disk drives, while in Model 20 systems, you can have up to five RZ23 hard disks in your system unit. The RZ23 disk drive has a storage capacity of 104 Mb.

RZ23 disks are mounted internally in the system unit. Additional disks can only be added if there is space available. To determine the number of disks in your system, enter `SHOW DEVICE` at the console prompt (`>>>`), then press the `RETURN`. The resulting display lists the storage devices mounted in your system, the type of device, and its address on the SCSI bus, along with other information. See Section 6.5 for further information on the `SHOW DEVICE` command.

You can increase the hard disk storage capacity of your system further by using RZ55 expansion boxes. See Chapter 4 to learn about these add-on devices.

3.1.2 TZ30 Tape Drive

The TZ30 is a cartridge tape drive that can store up to 95Mb (or characters) per CompactTape or CompactTape II cartridge.

The TZ30 can read or write data from a tape that was written by a TK50. The TZ30, however, can not read or write data from a tape that has been written by a TK70.

The TZ30 is used primarily to backup storage devices, and to load software onto your system. For example, the VMS operating system may be loaded from the TZ30. The tape-distributed version of VMS is loaded from a TK50-formatted tape.

On Model 10 systems, the TZ30 tape drive (if installed) is directly accessible from the front panel of the system unit.

On Model 20 systems, to access the TZ30 tape drive, position the system unit so that the front of it is facing you. Open the cover by pushing it in the direction indicated by the arrow in Figure 3-1 and then releasing it. Use the same procedure to close the cover when you have finished using the TZ30.

3.1.2.1 Tape Cartridges

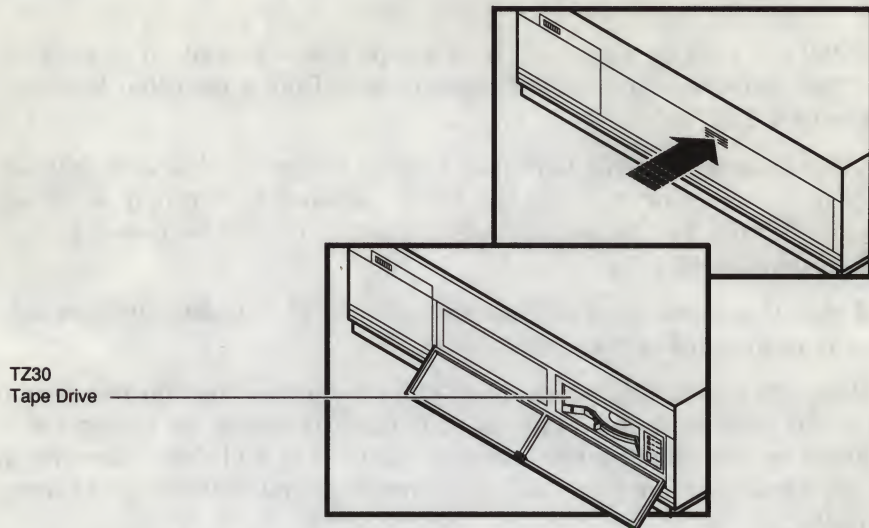
The TZ30 uses a tape cartridge (labeled COMPACTape or COMPACTape II) that contains the magnetic tape on a single reel. This single reel is an important feature to understand, because it affects the use of the TZ30.

When you insert the tape cartridge into the drive and load it, the tape is automatically threaded onto a take-up reel inside the drive. When the tape has been fully wound onto the take-up reel, it takes approximately 100 seconds to rewind completely.

NOTE: *The tape must be fully rewound before you can remove the cartridge from the tape drive.*

See Appendix F for information on the handling and storage of COMPACTape and COMPACTape II cartridges.

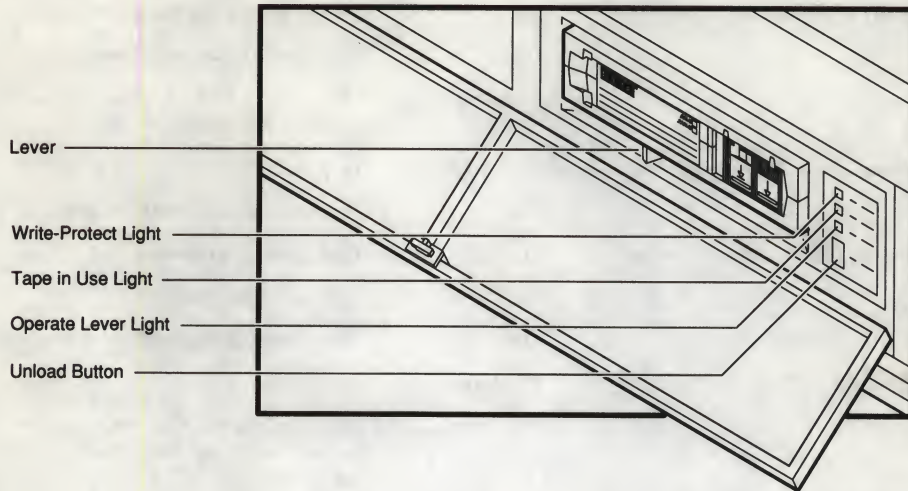
Figure 3-1: Accessing the TZ30 Tape Drive in Model 20 Systems



3.1.2.2 TZ30 Controls and Indicators

The TZ30 tape drive has two controls, an unload button and a cartridge lever, and four indicators, three LEDs and a beeper. Figure 3-2 shows the location of the controls and indicators on the TZ30 tape drive. Table 3-3 provides the functions of the controls and Table 3-4 gives the status information provided by the indicators.

Figure 3-2: TZ30 Tape Drive Controls and Indicators



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Table 3-3: TZ30 Controls

Control	Function
Unload Button	The unload button rewinds and disengages the tape from the take-up reel inside the TZ30. The tape must be completely re-wound and unloaded back into the cartridge before the cartridge can be removed from the drive.
Cartridge Lever ¹	The cartridge lever is used to lock or unlock a tape cartridge. To insert a tape cartridge, the cartridge lever must be in the unlock position. Once a cartridge is inserted and the green LED is on, move the cartridge lever to the lock position. To eject the cartridge from the drive, (only when the green LED is on or blinking, and after the momentary beeper sounds), move the cartridge lever to the unlock position.

¹When using the cartridge lever, be sure it is completely positioned in the lock or unlock position before beginning the next operation.

Table 3-4: TZ30 Indicators

Indicator	State	Condition
Green LED - Lever	On	OK to operate the cartridge lever
	Off	Don't operate the cartridge lever
	Blinking	The drive has detected a cartridge or calibration error
Yellow LED - Tape in Use	Blinking ¹	Tape in use ²
	On	Tape loaded and ready for use
Orange LED - Write Protected	On	Tape is write protected
	Off	Tape is write enabled
All three LEDs	On	The power-up diagnostic is in progress ³
All three LEDs	Blinking	Drive fault
Beeper ⁴	Two beeps	Indicates that the tape is unloaded and can be removed from the drive

¹Intermittent fast blinking indicates that a write is in progress. Continuous fast blinking indicates that a read is in progress. Medium blinking indicates calibration. Slow blinking indicates that the tape is initializing, loading, unloading or rewinding.

²LED blinks slowly for 10 seconds indicating drive initialization. This occurs only on power-up after the power-up diagnostic has run.

³All three LEDs light for a few seconds as the power-up diagnostic is running. If all three LEDs stay on, the power-up diagnostic has failed.

⁴The drive beeps once when it is powered-up. If a tape cartridge is not locked in the drive, it will beep twice after self-test diagnostics and drive initialization are completed. If a tape cartridge is locked into the drive before power-down, then upon power-up the drive will beep once and attempt to load the tape cartridge.

3.1.2.3 Inserting and Using the Tape Cartridge

To insert a tape cartridge, perform the following steps:

1. Be sure that the cartridge lever is in the unlock position.
2. Insert the tape cartridge.

If you insert the cartridge more than half way into the drive, you must complete this procedure. If you wish to use another cartridge, complete this procedure and perform the unload procedure to remove the tape cartridge.

If the tape cartridge cannot be inserted into the TZ30, move the cartridge lever to the lock position. Now move the cartridge lever back to the unlock position and reinsert the cartridge. Do not push the tape cartridge into the TZ30 while moving the cartridge lever between the lock and unlock positions. Otherwise the TZ30 interprets this as an insertion of the tape cartridge.

3. The green LED will light.
4. Move the cartridge lever to the lock position to lock the tape cartridge in the drive. The green LED turns off and the yellow LED begins to blink, indicating that the tape is loading. When the tape is loaded (ready for use), the yellow LED stays on steadily. Whenever the yellow LED is on steadily and the green LED remains off, the tape is ready to use.

If the write protect switch on the cartridge is in the protected position, the orange write protect LED is on and you will be unable to write data to the tape. If you move the write protect switch to the write enable position during operation, the system software does not recognize the fact that the tape is no longer write protected. You must reload the tape cartridge again before the system software recognizes the cartridge as write enabled.

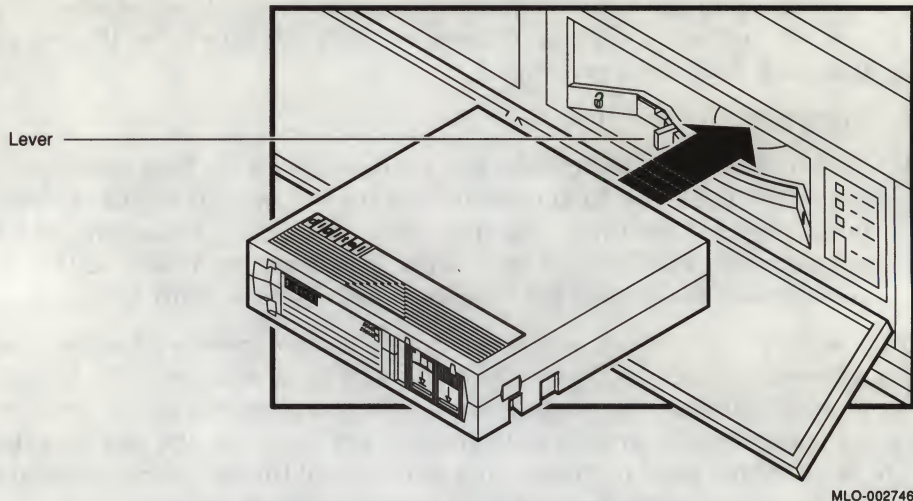
Similarly, if you move the write protect switch from the write enabled position to the write protected position during operation, the tape is not actually write protected until the operating system dismounts and remounts the tape.

When the yellow LED is on steadily, you can proceed with your operation. For example, you may boot your operating system, or possibly, back up files onto the TZ30. See your system documentation for instructions for these and other operations.

When the tape drive is reading, writing, or rewinding a tape cartridge, the yellow LED blinks *rapidly*.

If errors occur during an operation, all three LEDs blink. The green LED will blink if a faulty tape cartridge is inserted. If this occurs, see Section 3.1.2.5.

Figure 3-3: Inserting the Tape Cartridge



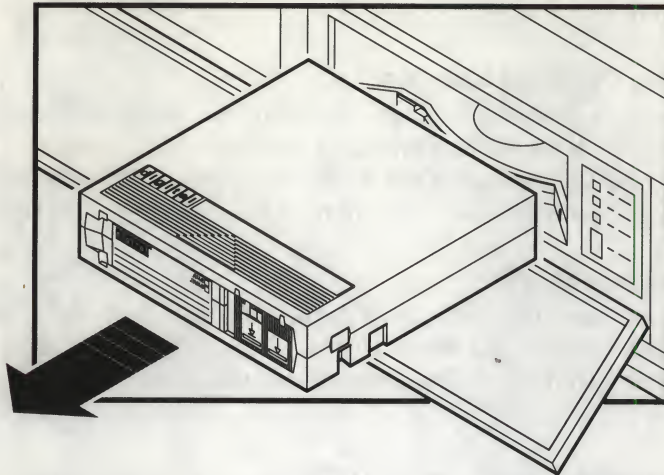
3.1.2.4 Removing a Tape Cartridge from the Drive

To remove a tape cartridge, perform the following steps:

1. Press the unload button (Figure 3-4) or issue the appropriate system software command. The yellow LED will flash as the tape rewinds. Once the tape has rewound completely, the beeper sounds twice and the green LED will light.
2. Move the cartridge lever to the unlock position.
3. The cartridge ejects and can be removed from the tape drive.

CAUTION: Remove tape cartridges from the drive before turning off the drive's power. Failure to do this can result in damage to the cartridge and tape drive.

Figure 3-4: Removing a Tape Cartridge



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3.1.2.5 If You Have Problems

If the TZ30 tape drive fails, read the following information. It may help you resolve the problem.

Recoverable Errors During Tape Motion

If a drive error occurs during an operation, you may be able to clear the fault, reset the drive, rewind, unload, and remove the tape cartridge. Try another tape cartridge to determine if the TZ30 or the tape cartridge is at fault.

Clearing a Recoverable Error

If all three LEDs are blinking (indicating that an error has occurred), press the unload button. If the detected error is recoverable, the tape will begin to rewind. While the tape is rewinding, the yellow LED blinks. When the tape has unloaded, the drive will beep twice and the green LED will light. You can then move the cartridge lever to the unlock position to eject the tape cartridge.

Nonrecoverable Errors During Tape Motion

If the tape does not rewind when you push the unload button and the LEDs continue to blink, the error is not recoverable. Call your authorized service representative.

Errors During Cartridge Insertion

When the tape cartridge is damaged, or if internal portions of the drive that handle the cartridge are not working, a cartridge fault occurs. If the green LED blinks and the tape does not move (the yellow LED does not blink), a cartridge fault has been detected. Remove the cartridge and try another.

Cartridge Incompatibility

If you cannot read or write on a tape cartridge, you may be using a cartridge that is incompatible with the TZ30. The green LED may also blink indicating that the TZ30 detected a cartridge error.

Testing

If you obtained diagnostics from DIGITAL or your authorized DIGITAL representative, follow the instructions you received with your diagnostic tape or diskette to detect any problems with the TZ30 or other device on your system.

Inspection

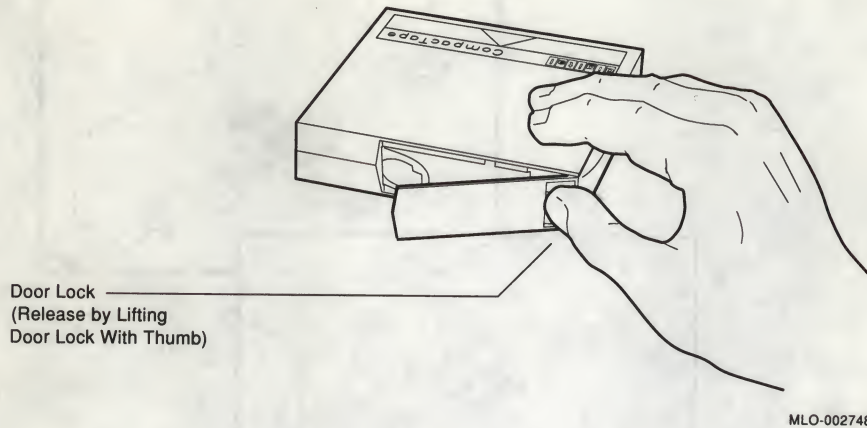
If you have trouble loading a tape cartridge, it is a good idea to perform a brief inspection of the tape cartridge leader.

Inspecting the Cartridge

Figure 3-5 shows the correct position of the tape leader inside the cartridge. Before you attempt to use the tape cartridge, be sure the tape leader is in the same position as the one in Figure 3-5. Lift the catch with your thumb and open the small door to expose the leader.

CAUTION: *Do not touch exposed portions of magnetic tape. If the tape leader is not in the correct position, do not attempt to fix it. Use a new cartridge instead.*

Figure 3-5: Inspecting the Cartridge Leader



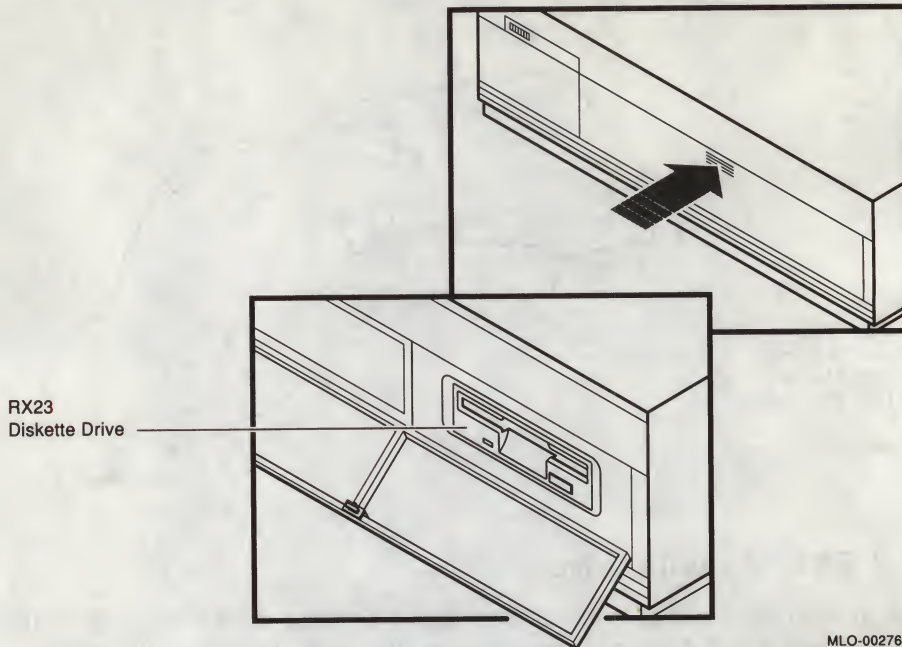
3.1.3 RX23 Diskette Drive

Your system may include one or two RX23 diskette drives. In Model 10 systems, one RX23 diskette drive may be installed. In Model 20 systems, one or two RX23 diskette drives may be installed. These devices enable you to read information from and write information to 3.5 inch removable diskettes.

On Model 10 systems, the RX23 tape drive (if installed) is directly accessible from the front panel of the system unit.

On Model 20 systems, to access the RX23 diskette drive, position the system unit so that the front of it is facing you. Open the cover by pushing it in the direction indicated by the arrow in Figure 3-6 and then releasing it. Use the same procedure to close the cover when you have finished using the RX23.

Figure 3-6: Accessing the RX23 Diskette Drive in Model 20 Systems



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NOTE: *Figure 3-6 shows an RX23 diskette drive in the right compartment of a Model 20 system. It may also be installed in the left compartment.*

3.1.3.1 Diskettes

The RX23 diskette drive uses RX23K diskettes which have a capacity of 1.4Mb. See Appendix F for information on the handling and storage of diskettes.

3.1.3.2 Inserting a Diskette

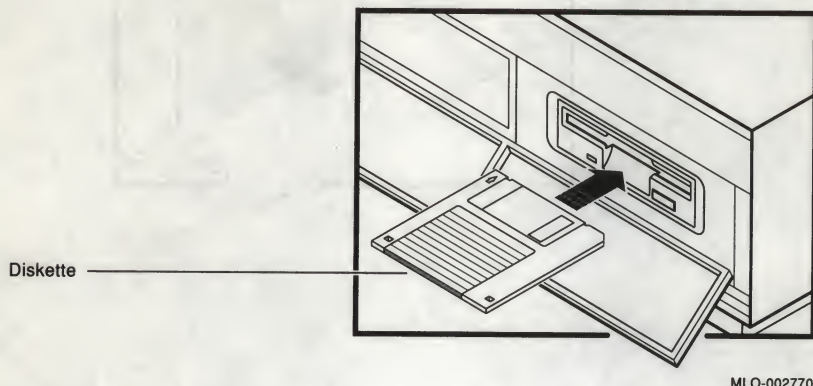
The drive can hold one diskette.

CAUTION: *Never remove or insert a diskette while the diskette drive is performing a function. Inserting or removing a diskette while your system is using the diskette can cause incorrect data to be written to the diskette, and can cause damage to the diskette itself. Wait until the diskette drive finishes doing whatever you requested it to do. When the diskette drive is in use, the green light on the front of the diskette drive is on.*

To insert a diskette into the diskette drive slot, slide the diskette into the drive, as shown in Figure 3-7.

The diskette slides straight in and drops down to its load position.

Figure 3-7: Inserting a Diskette

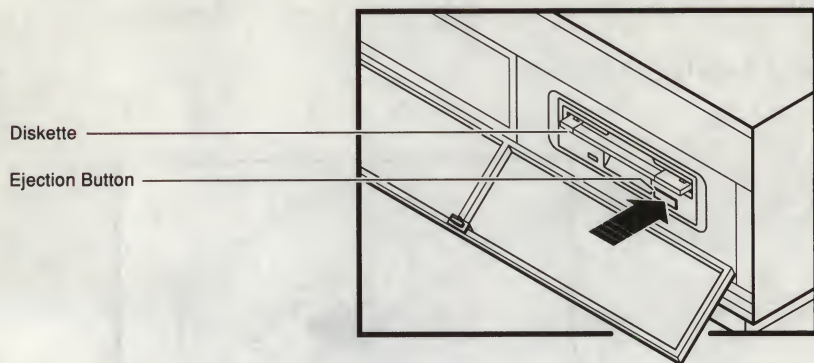


3.1.3.3 Removing a Diskette

You must dismount the diskette drive before removing a diskette. For information on dismounting, see your software documentation.

To remove a diskette from the diskette slot, push the eject button in the lower right side of the diskette drive, as shown in Figure 3-8.

Figure 3-8: Removing a Diskette



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Chapter 4

Expanding Your System

This chapter provides information about installing and using external add-on disk storage and software load devices.

The following expansion boxes are recommended for use with MicroVAX 3100 and VAXserver 3100 systems:

- RRD40 compact disc expansion box (600Mb)
- RZ55 hard disk expansion box (332Mb)
- TK50Z tape expansion box (95Mb).

Instructions for the following tasks are included in this chapter:

- Connecting two expansion boxes of the same type to your system unit
- Verifying the SCSI ID default (factory) switch setting on the first expansion box
- Setting the SCSI switches on a second expansion box.

The RZ55 and TK50Z Expansion Boxes

The RZ55 hard disk and the TK50Z tape drive provide disk and tape storage for your system. Optionally, the TK50Z can be used as a software load device.

- The RZ55 and the TK50Z are enclosed in similar expansion boxes.
- These expansion boxes are shipped with the appropriate cables and connectors for connecting more than one box. The installation procedure is the same for both types of expansion box.
- The RZ55 and the TK50Z expansion boxes have external SCSI ID switches. If a second RZ55 or a second TK50Z is added to the SCSI bus, its SCSI ID must be changed to an unused ID. This is because no two devices on an SCSI bus can have the same ID. The external switches make it easier to change the SCSI ID.

The RRD40 Expansion Box

The RRD40 expansion box is a read-only storage device that reads data from removable compact discs.

The RRD40 can be used for many purposes. For example, it can be used for software installation and database storage.

- The tabletop version of the RRD40 is contained in a smaller expansion box than the RZ55 and the TK50Z expansion box.
- The installation procedure for the RRD40 is the same as that for the RZ55 expansion box and TK50Z expansion box.
- The RRD40 expansion box has external SCSI ID switches that can be changed if necessary, depending on your configuration.
- A voltage selector switch permits the selection of the correct voltage for your power requirements.

4.1 Guidelines for Connecting Expansion Boxes

Use the following guidelines when connecting expansion boxes:

- You can connect any combination of the three expansion boxes (RZ55, TK50Z-GA, RRD40), as long as you do not connect more than three expansion boxes to the system at a time.
- You must attach the 50-pin terminator that comes with your expansion box to an unused SCSI connector on the back of an expansion box.
- All expansion boxes should be plugged into the same grounded power strip or electrical outlet.

CAUTION: *Some expansion boxes are restricted to either 110 VAC or 220 VAC operation. Check to ensure that the voltage requirement of any expansion box used is compatible with the supply voltage. The RRD40 expansion box has a switch for power input voltage selection.*

- Turn on all expansion boxes before you turn on your system unit.

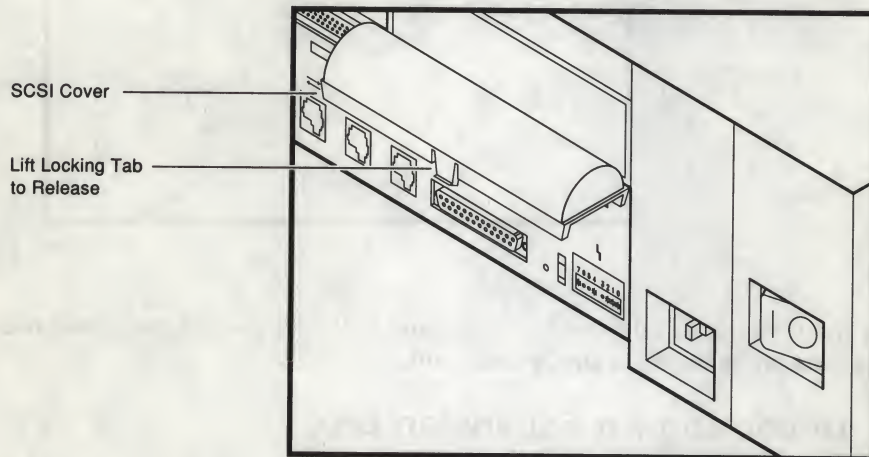
This procedure ensures that the device in each expansion box is ready for use, and that the system firmware includes the device in its configuration.

4.2 Preparing Your System for an Expansion Box

If you plan to add an expansion box to your system, you must first remove the SCSI cover and the terminator connected to the SCSI port.

1. To remove the SCSI cover, place your fingers under the locking tab and lift the cover to release it as shown in Figure 4-1.

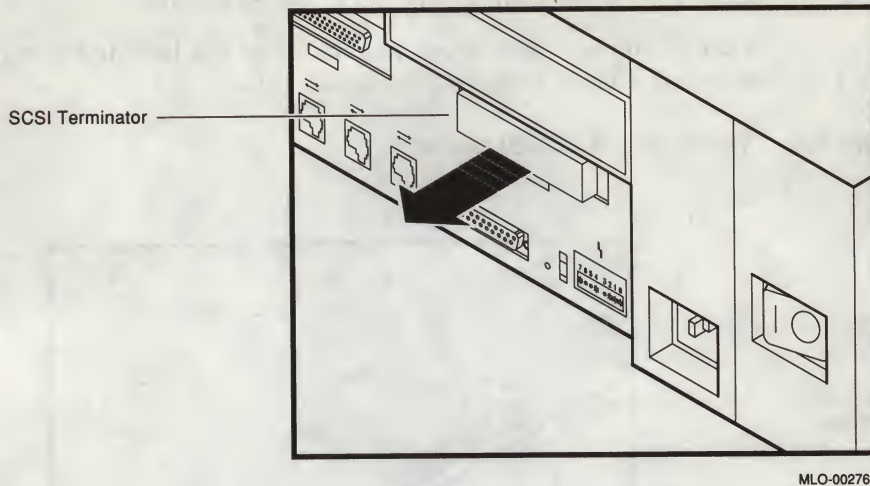
Figure 4-1: Removing the SCSI Cover



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2. Remove the SCSI terminator. Figure 4-2 shows you how to remove the terminator.

Figure 4-2: Removing the SCSI Terminator



Save the terminator and cover — you must reattach them if you disconnect all expansion boxes from the system unit.

4.3 Unpacking An Expansion Box

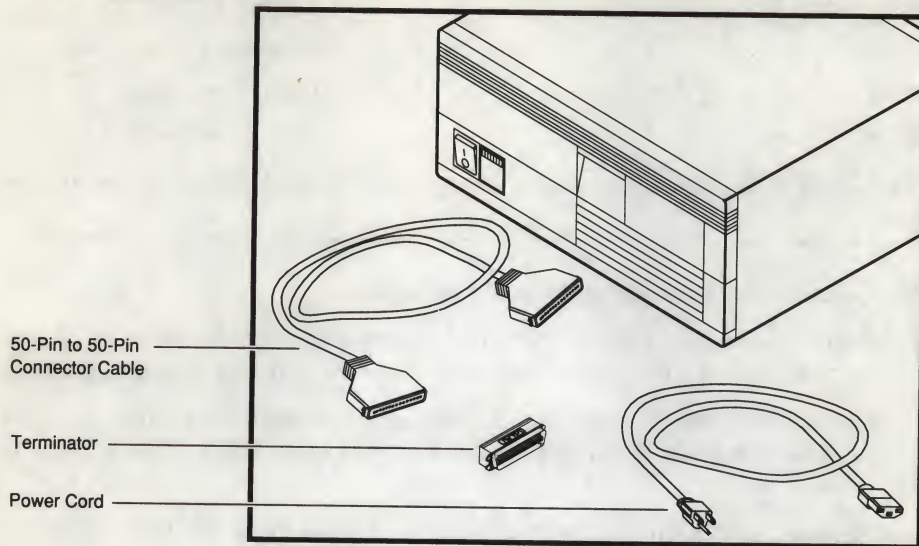
Each expansion box is shipped from the factory with the following accessories:

- One 50-pin to 50-pin cable. Use this cable to connect the expansion box to the system unit or to other expansion boxes.
- One power cord.
- One 50-pin terminator. Use this to terminate the last expansion box.
- One cable with a 68-pin connector at one end and a 50-pin connector at the other end. This cable is not used with MicroVAX 3100 or VAXserver 3100 systems.

Make sure you have all the parts shown in Figure 4-3 before you set up your expansion box.

In addition, the TK50Z expansion box comes with a blank tape and the RRD40 compact disc drive expansion box comes with a empty CD caddy and a test disc.

Figure 4-3: Expansion Box and Accessories



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4.4 Connecting One Expansion Box

To connect a single expansion box to your system unit, perform the following steps:

1. Set the on/off switches on the system unit and expansion box to the off (0) position.
2. Turn the expansion box so that the back is facing you.
3. Verify the SCSI ID switch positions.

Each device is shipped from the factory with the default switch positions shown in Table 4-1. Read the switch positions from left to right. See Figures 4-9, 4-11, and 4-13.

Table 4-1: Expansion Box SCSI ID Factory Default Switch Positions

Expansion Box	SCSI ID	Switch Positions
RRD40	4	Up, Down, Down, Unused
RZ55	1	Down, Down, Up
TK50Z	5	¹ Down, Up, Down

¹The TK50Z SCSI ID switch convention is the opposite to the convention on the other devices.

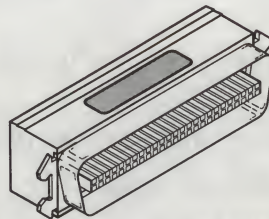
4. Connect the expansion box cable as follows:

Connect one end of the 50-pin to 50-pin connector cable to the SCSI port on the back of the system unit and snap the bail lock loops in place.

Connect the other end of the 50-pin to 50-pin connector cable to either port on the back of the expansion box and snap the bail lock loops in place.

5. Connect a 50-pin terminator to the unused port on the expansion box. Figure 4-4 shows you what the 50-pin terminator looks like. Figure 4-5, 4-6, and 4-7 show the terminator in place.

Figure 4-4: 50-pin Terminator



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CAUTION: Check the voltage requirement of the expansion box before powering up.

6. Connect the power cord to the expansion box receptacle and plug the other end into an electrical outlet.

Figure 4-5 shows how to connect one RZ55 or one TK50Z expansion box to your system unit.

Figure 4-5: Connecting One TK50Z or One RZ55 Expansion Box

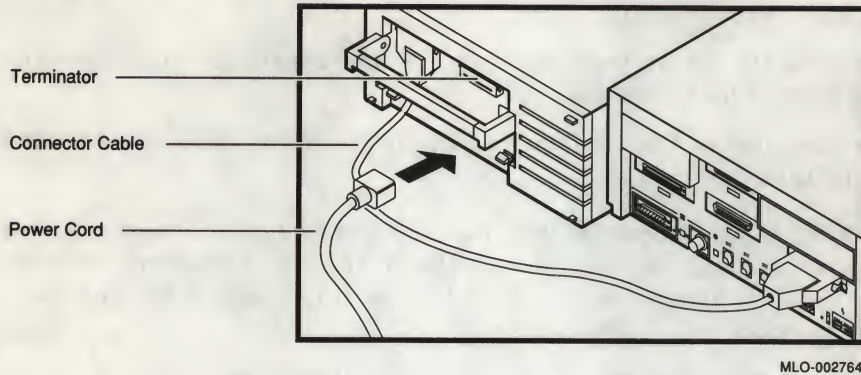
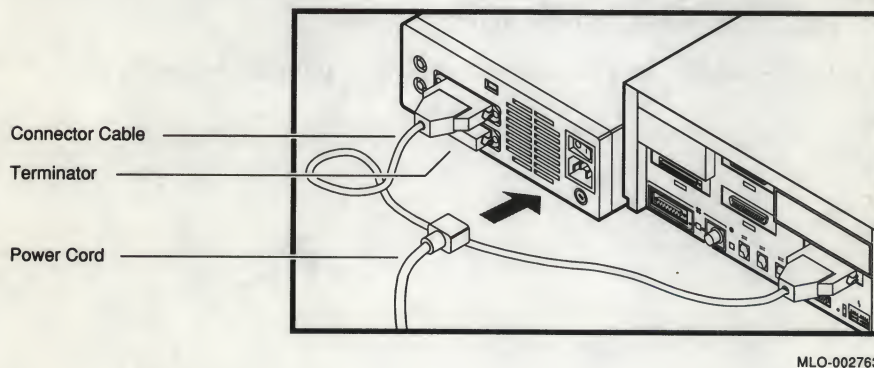


Figure 4-6 shows how to connect one RRD40 expansion box.

Figure 4-6: Connecting One RRD40 Expansion Box



4.5 Connecting Two Expansion Boxes

You can add an additional expansion box at a later time and daisy-chain the second box to the first. To daisy-chain (link two expansion boxes together in series), perform the following steps:

1. Make sure the on/off switches on the system unit and all expansion boxes are set to off (0).
2. Remove the 50-pin terminator on the first expansion box. Store the terminator for future use.
3. Connect one end of the 50-pin to 50-pin connector cable to the second expansion box.

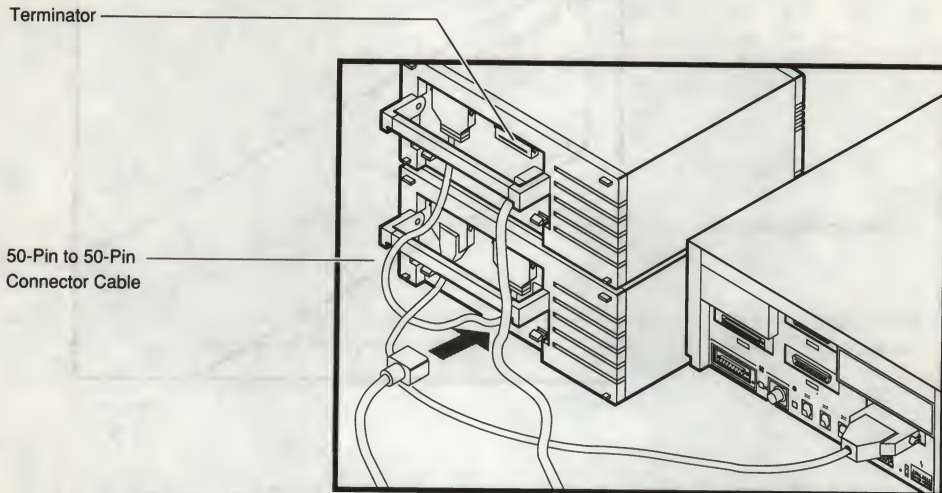
NOTE: *If you have more than one of the same type of device attached to your system, you must change the SCSI ID on the second device to an open ID number on the SCSI bus. See Appendix B for additional information.*

4. Connect the other end of the 50-pin to 50-pin connector cable to an available port on the first expansion box.
5. Attach a 50-pin terminator to the unused SCSI port on the second expansion box.
6. Connect the power cord of the second expansion box to the expansion power receptacle and plug the other end into an electrical outlet. Each expansion box needs its own source of power.

Figure 4-7 shows how to daisy-chain two expansion boxes.



Figure 4-7: Connecting Two Expansion Boxes



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4.6 RRD40 Compact Disc Expansion Box

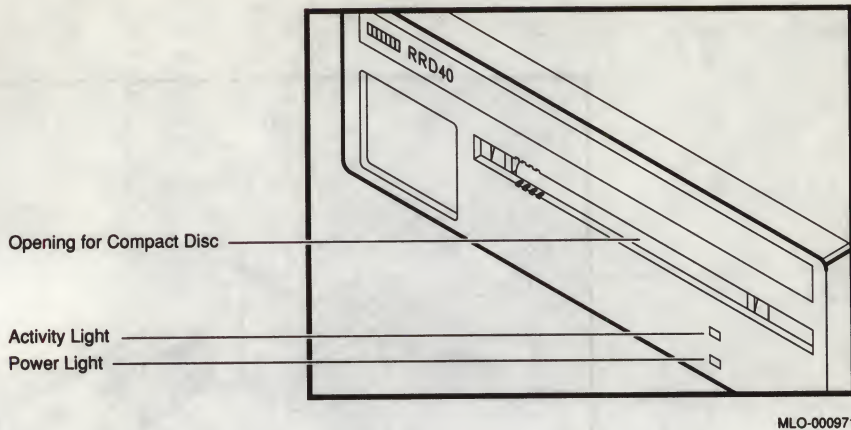
The RRD40 is a read-only storage device that reads data from removable compact discs. See Appendix F for information on the handling and storage of compact discs.

The RRD40 compact disc drive expansion box has an opening for a compact disc and two lights. When you turn on your system unit, the power light goes on. The activity light goes on when you load a compact disc in the drive; it flashes when the disc is transferring information.

If you have ordered an RRD40 expansion box, see the beginning of this chapter for installation and unpacking instructions.

Figure 4-8 shows the RRD40 compact disc expansion box.

Figure 4-8: Tabletop RRD40 Expansion Box

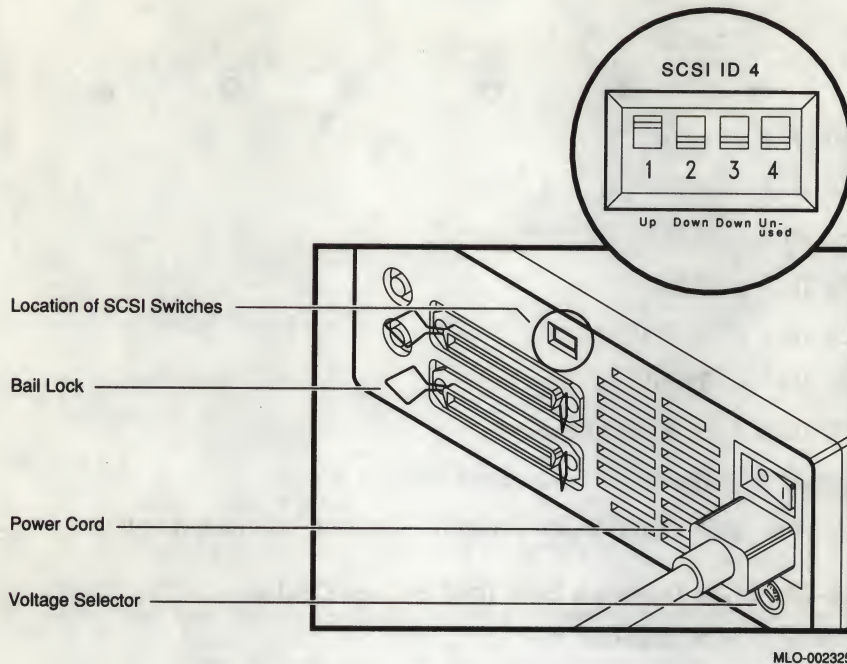


4.6.1 Selecting the Voltage on the RRD40 Expansion Box

CAUTION: *The RRD40 expansion box has a voltage selection switch which must be set to correspond with your power source.*

Turn the RRD40 so that the back is facing you. Note that the RRD40 has a voltage selector switch that can be set to one of two voltages (110V or 220V). Check that the voltage selector switch on your RRD40 is set to the correct voltage for your power requirements. Figure 4-9 shows you the location of the voltage selector switch.

Figure 4-9: RRD40 Voltage Selector, and SCSI ID Switch Positions



4.6.2 Verifying the SCSI ID on the RRD40 Expansion Box

The RRD40 expansion box is shipped from the factory with the SCSI switches set to number 4 (up, down, down). See Figure 4-9

4.6.3 Resetting the SCSI ID on the Second RRD40 Expansion Box

If you are adding two RRD40 expansion boxes to your configuration, you must reset the switches on the second RRD40. The second RRD40 expansion box should be set to an open ID (one that is not currently being used); for example, ID 0 with the switches in the following positions down, down, down.

To determine available IDs on the SCSI-B bus on a MicroVAX 3100 or VAXserver 3100 system, enter TEST 50 at the console prompt (>>>), then press RETURN. Your system configuration appears on the screen.

FFFFFF05 indicates an open SCSI ID. Look for a display similar to the following:

```
SCSI-B      1C1C.0001   V1.3
FFFFFF05 00000001 00000001 00000001 05000001 01000001 FFFFFFF03 FFFFFFF05
  ①      ②      ③      ④      ⑤      ⑥      ⑦      ⑧
```

- ① SCSI ID 0 — open
- ② SCSI ID 1 — RZ55
- ③ SCSI ID 2 — RZ23
- ④ SCSI ID 3 — RZ23
- ⑤ SCSI ID 4 — RRD40
- ⑥ SCSI ID 5 — TK50Z
- ⑦ SCSI ID 6 — SCSI-B controller
- ⑧ SCSI ID 7 — Reserved for highest priority device

The following table explains the codes used in the previous display:

Table 4-2: SCSI Devices Self-Test Status Codes

Status Code	SCSI Device
FFFFFF05	Device is off-line or not installed at this address
FFFFFF03	SCSI bus controller
FFFFFFF	Device not tested - possible SCSI bus controller error
00000001	RZ23 disk drive, RZ55 disk drive, or RX23 diskette drive
01000001	TZ30 or TK50Z tape drive
05000001	RRD40 compact disc drive

4.6.4 Loading A Compact Disc

When you load a disc into the compact disc drive, insert the entire disc *caddy* into the disc door on the drive. Do not remove the disc from the caddy.

To load a disc:

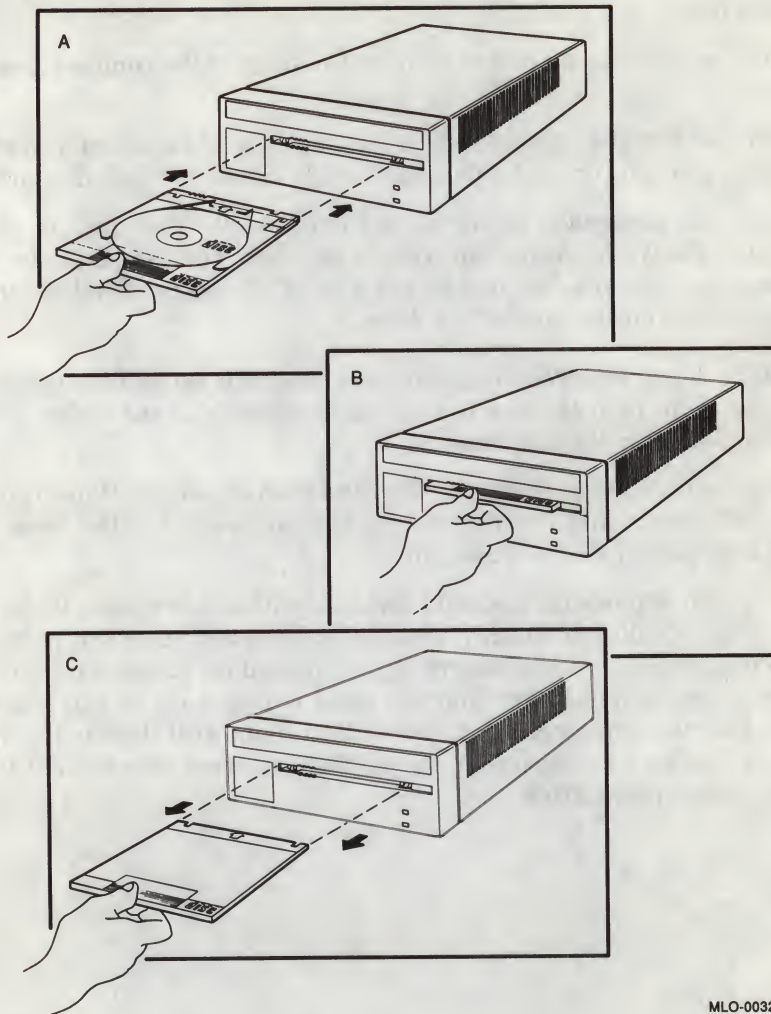
1. Make sure the green power light on the front of the compact disc drive is on.
2. Examine the disc caddy. Make sure that it is not cracked or damaged in any way. Never load a damaged caddy into a compact disc drive.
3. Insert the disc caddy as shown in Figure 4-10. The label on the disc should always be facing up when you insert the disc into the drive. Make sure the notches on the left side of the disc caddy line up with the notches on the door of the drive.

NOTE: *If you have the disc positioned label side up and the notches are on the right, then the disc is oriented improperly in the caddy. Proceed no further with the disc loading.*

4. Slide the caddy in as far as it will go and then remove it. When removed, you will notice that the disc and its *housing* remain in the drive. Only the *transparent sleeve* comes out.

The green activity light should come on within 5 seconds. If the drive accepted the disc and caddy, and the activity light does not light, then the disc may be sitting incorrectly in the caddy. Remove the disc and then check to make sure that the label is facing up as you insert the disc into the drive again. If the activity light still does not come on, there may be a problem with the RRD40. Contact your local DIGITAL Service Representative.

Figure 4-10: Compact Disc Loading



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4.6.5 Unloading a Compact Disc

Before unloading a compact disc, make sure that the green activity light is not flashing. If it is flashing, then the compact disc drive is transferring data. Wait until the green activity light stops flashing.

1. Position the transparent sleeve as for loading. Make sure the arrow on the sleeve is going into the drive opening first.
2. Insert the sleeve into the drive opening as far as it will go.
3. Remove the caddy. The disc and housing will be in the sleeve. The green activity light will go out.

4.7 RZ55 Hard Disk Expansion Box

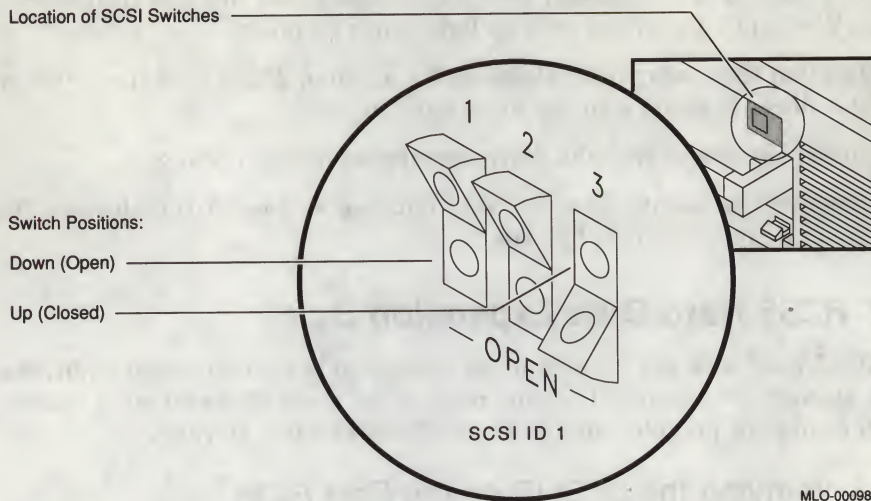
An RZ55 hard disk is available in an expansion box. If you need additional disk storage, you can add one or more RZ55 hard disks to your system. Each hard disk provides an additional 332Mb of disk storage.

4.7.1 Verifying the SCSI ID on the First RZ55

Turn the expansion box so that the back is facing you. On the right side, in a small recessed area behind the handle, there is a set of red and white switches surrounded by a label. Do not remove the label.

Figure 4-11 shows the back of the expansion box and the location of the switches.

Figure 4-11: Setting SCSI ID on the RZ55



Verify that the switches are in the following positions (left to right): down, down, up. The RZ55 expansion box is shipped from the factory with the switches set at SCSI ID 1. You do not need to change the SCSI ID switch settings on the first RZ55 expansion box.

4.7.2 Resetting the SCSI ID on the Second RZ55

To determine available IDs on the SCSI-B bus, enter TEST 50 at the console prompt (>>>), then press RETURN. Your system configuration is displayed on the screen. FFFFFFF05 indicates an open ID. Look for a display similar to the following:

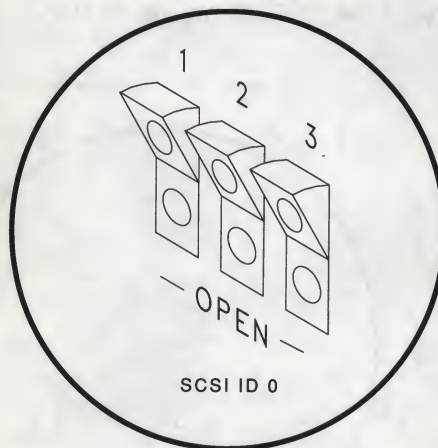
```
SCSI-B      1C1C.0001   V1.3
FFFFFF05  00000001  00000001  00000001  05000001  01000000  FFFFFFF03  FFFFFFF05
  ①        ②        ③        ④        ⑤        ⑥        ⑦        ⑧
```

- ① SCSI ID 0 — open
- ② SCSI ID 1 — RZ55
- ③ SCSI ID 2 — RZ23
- ④ SCSI ID 3 — RZ23
- ⑤ SCSI ID 4 — RRD40

- ⑥ SCSI ID 5 — TK50Z
- ⑦ SCSI ID 6 — SCSI-B controller
- ⑧ SCSI ID 7 — Reserved for highest priority device

If you are adding a second RZ55, you must change the SCSI ID to 0 or any other open ID on the SCSI-B bus. Each device on the bus must have a unique SCSI ID. For SCSI ID 0, set the switches to the following positions (left to right): down, down, down. See Figure 4-12.

Figure 4-12: Resetting the SCSI ID on the Second RZ55



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4.8 TK50Z Tape Expansion Box

The TK50Z tape drive is available in an expansion box. The drive is located behind a protective door. The TK50Z holds one removable TK50-K or TK52-K magnetic tape cartridge. Use the tape cartridge to load software or data files, or to make copies (or backups) of your files. See Appendix F for information on the handling and storage of magnetic tape cartridges.

The TK50Z tape drive has two primary controls: the cartridge release handle and the load/unload button. The cartridge release handle allows cartridges to be inserted, locked into position, and removed. The load/unload button controls winding and rewinding of the tape. The in

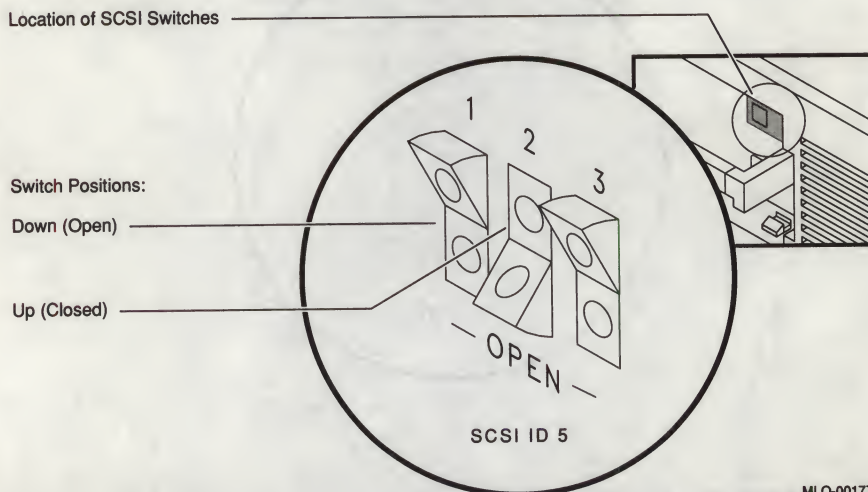
(on) position of the load/unload button is for loading tape cartridges. The out (off) position is for unloading tape cartridges.

4.8.1 Verifying the SCSI ID on the First TK50Z

Turn the expansion box so that its back is facing you. On the right side, in a small recessed area, there is a set of red and white switches surrounded by a label. Do not remove the label. Figure 4-13 shows the back of the expansion box and the location of the switches.

NOTE: *The TK50Z SCSI ID switch convention is the opposite to that of the RZ55. A switch in the down position is ON (logical 1). See Figure 4-13.*

Figure 4-13: Verifying the SCSI ID on the TK50Z



The TK50Z tape drive is shipped from the factory with the switches set to SCSI ID 5. The switches should be in the following positions (left to right): down, up, down. Leave the switches in the default (factory) positions.

4.8.2 Resetting the SCSI ID on the Second TK50Z

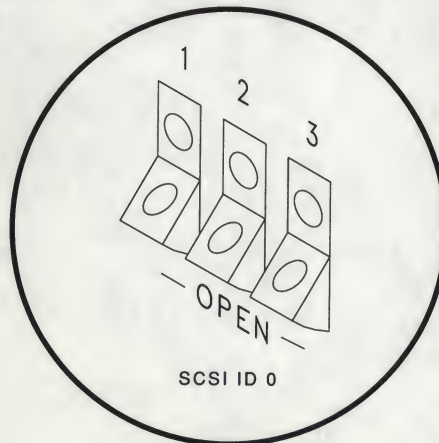
To determine available IDs on the SCSI-B bus, enter TEST 50 at the console prompt (>>>), then press RETURN. Your system configuration is displayed on the screen. FFFFFFF05 indicates an open ID. Look for a display similar to the following:

SCSI-B 1C1C.0001 V1.3
 FFFFFFF05 00000001 00000001 00000001 05000001 01000000 FFFFFFF03 FFFFFFF05
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① SCSI ID 0 — open
- ② SCSI ID 1 — RZ55
- ③ SCSI ID 2 — RZ23
- ④ SCSI ID 3 — RZ23
- ⑤ SCSI ID 4 — RRD40
- ⑥ SCSI ID 5 — TK50Z
- ⑦ SCSI ID 6 — SCSI-B controller
- ⑧ SCSI ID 7 — Reserved for highest priority device

If you are adding a second TK50Z, you must change the SCSI ID to 0 or any other open ID on SCSI-B bus. Each device on the bus must have a unique SCSI ID. For SCSI ID 0, set the switches to the following positions (left to right): up, up, up. See Figure 4-14.

Figure 4-14: Resetting the SCSI ID on the Second TK50Z



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4.8.3 Inserting a Tape Cartridge

The TK50Z uses TK50-K or TK52-K tape cartridges. For information on the handling and storage of tape cartridges, see Appendix F.

Make sure the load/unload button is in the out (unload) position.

The red load/unload button comes on for approximately 4 seconds during the tape drive automatic power-up test.

The red light goes off and the green light comes on, indicating that it is safe to move the cartridge release handle.

If a cartridge is new, the tape drive performs a calibration sequence that takes approximately 40 seconds. The green light flashes rapidly and irregularly during calibration.

CAUTION: *Do not move the cartridge release handle unless the red light is off and the green light is on.*

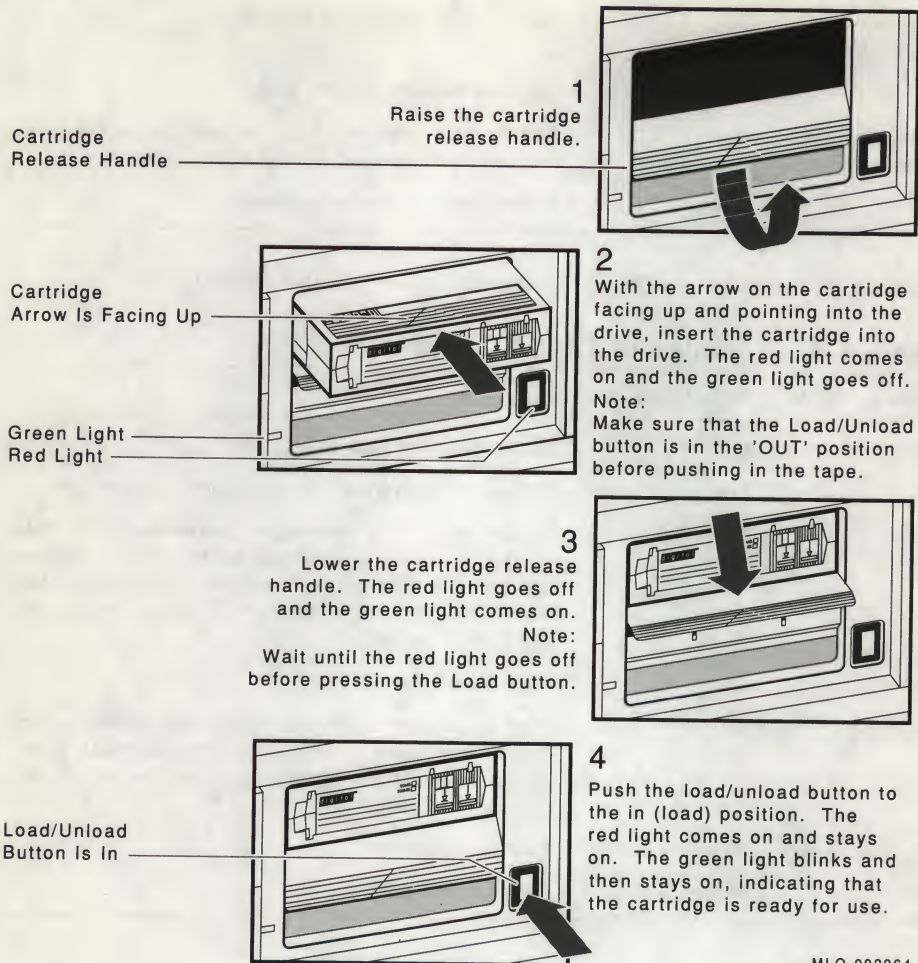
Do not move the cartridge release handle while either light is flashing.

If the red light flashes rapidly at any time, press the load/unload button four times. If the problem persists, do not attempt to use the tape drive or remove the cartridge.

Figure 4-15 shows you how to insert and load a tape cartridge.



Figure 4-15: Inserting and Loading a Tape in the TK50Z Expansion Box



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4.8.4 Summary of TK50Z Controls and Lights

Table 4-3 summarizes the function of the TK50Z controls.

Table 4-3: Function of TK50Z Physical Controls

Control	Position	Function
Load/unload button	In	Loads the tape (10 to 15 seconds).
	Out	Rewinds and unloads the tape.
Cartridge release handle	Up	Allows you insert a tape or remove a tape after rewind and unload operations are completed.
	Down	Locks tape in operating position.

Table 4-4 summarizes the function of the TK50Z indicator lights.

Table 4-4: Function of TK50Z Lights

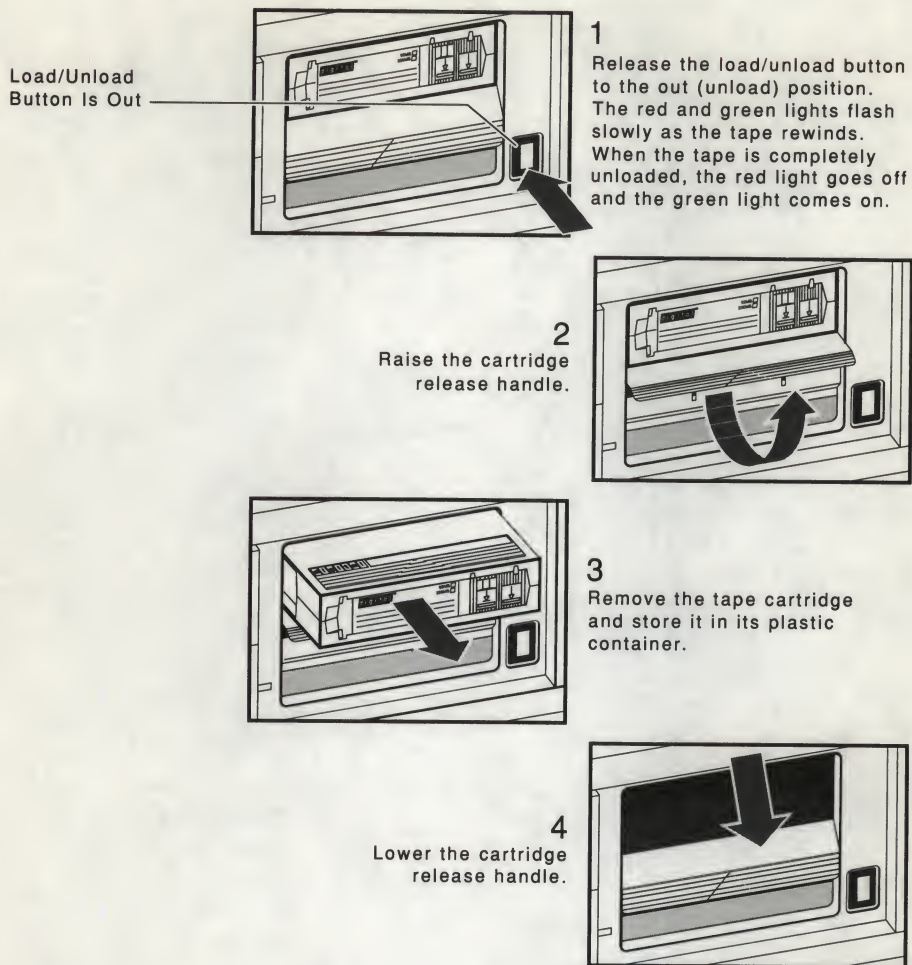
Green light	Red light	Function
Off	Off	No power to the tape drive.
On	Off	Safe to move cartridge release handle. Power is on.
Off	On	Do not move the cartridge release handle. One of the following conditions is in effect: power-up test is occurring; cartridge is inserted but handle is still up; tape is loading or unloading; tape is stopped.
On	On	Tape loaded successfully.
Flashing	On	Tape is in motion (except rewind). Read/write commands are being processed. Irregular fast flashing of green light means tape calibration is occurring (first use of tape).
Flashing slowly	Flashing slowly	Tape is rewinding.
Off	Flashing rapidly	Tape or drive fault exists.

4.8.5 Removing a Tape Cartridge

Tape cartridges must be unloaded (rewound) before being removed from the drive. Rewinding a tape can be done under software control. See your software documentation for information.

Figure 4-16 shows how to remove a tape cartridge.

Figure 4-16: Unloading and Removing the TK50 Tape



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1. The first part of the paper is devoted to a discussion of the general theory of the problem. It is shown that the problem is equivalent to a system of linear equations.

2. In the second part, the problem is solved for the case of a single point. It is shown that the solution is unique and can be found by a simple method.

3. In the third part, the problem is solved for the case of a continuous distribution. It is shown that the solution is unique and can be found by a simple method.

4. In the fourth part, the problem is solved for the case of a continuous distribution. It is shown that the solution is unique and can be found by a simple method.

5. In the fifth part, the problem is solved for the case of a continuous distribution. It is shown that the solution is unique and can be found by a simple method.

6. In the sixth part, the problem is solved for the case of a continuous distribution. It is shown that the solution is unique and can be found by a simple method.

7. In the seventh part, the problem is solved for the case of a continuous distribution. It is shown that the solution is unique and can be found by a simple method.

Chapter 5

Connecting to a Network

This chapter contains information on how to:

- Connect and test your system with a T-connector and loopback connector in preparation for connecting to a network
- Create a simple daisy-chain work group

When you daisy-chain systems together to form a work group, you connect systems together sequentially with cables and connectors.

Connecting a system to a ThinWire Ethernet network or a Standard Ethernet network takes only a few minutes for an experienced user, slightly longer for a new user.

5.1 A Brief Introduction to Networks

Networks are useful to people who need to work together and share information. People like working cooperatively on projects; they need to communicate and exchange information, share common databases, share files and disk storage, share printers, or use a mail system. DIGITAL networking lets them do all these.

For network installation instructions, proceed to Section 5.2. For users who want more background, here are a few networking definitions to help you get started:

- *Network*—A network is a group of computers, connected by communications lines, that share information and resources. A network can span a small office, a department, a building, a country, or it can be worldwide. DIGITAL hardware and DECnet software enable computers to form a network.
- *Local Area Network (LAN)*—A local area network is a high-speed communications network that covers a limited geographical area, such as an office area, a department, a building, or a campus (group of buildings).

- *Ethernet*—Ethernet is the DIGITAL local area network. In 1980, Digital Equipment Corporation, Xerox Corporation, and Intel Corporation came up with a specification for the Ethernet local area network. The specification includes information on how to connect devices to a coaxial cable, how to configure nodes, the maximum number of nodes, and the distance between nodes.
- *ThinWire Ethernet*—All DIGITAL Ethernet products can connect to ThinWire cable. ThinWire cable can be used in any size environment; it is flexible, fully compatible with standard Ethernet, inexpensive, and offers 10 megabit-per-second communication. ThinWire is ideal for small daisy-chain standalone networks in which the users share resources, such as printers and storage devices.
- *Standard Ethernet*—Standard Ethernet coaxial cable is used to connect wiring centers and computer facilities, floors of buildings, and standalone ThinWire segments. It is of rugged construction, reliable, and immune to external factors that might otherwise limit high-speed 10 megabit-per-second data communication.
- *DECnet*—DECnet networking software enables many DIGITAL computer systems to form a network. It runs on systems in both local area networks and wide-area networks.
- *DECnet-ULTRIX*—ULTRIX-32 software is DIGITAL's version of the UNIX operating system. DECnet-ULTRIX provides an Ethernet-based communication link between the VMS and ULTRIX operating systems. ULTRIX-32 also uses Transmission Control Protocol/Internet Protocols (TCP/IP) to facilitate interaction with Internet networks.
- *Work group*—A work group consists of cooperating systems; Ethernet cable connects each of the computers together. Work groups are formed using ULTRIX-32 software or VAX/VMS and DECnet software.
- *Local Area VAXcluster (LAVc)*—A Local Area VAXcluster is a group of VAX systems that connect by means of Ethernet cable to form a cluster (a special work group) in order to share resources, printers, and disk storage. A LAVc consists of up to 42 nodes, any member can be the server node. The VAXserver 3100 system is used as a server node in a local area VAXcluster.
- *DECconnect*—DECconnect is a family of networking products that includes network electronics, cabling and connections.

5.2 Connecting to a ThinWire Ethernet Network

If your system is a networked standalone system, that is, a system that starts and operates independently of all other computers, you need only make one network connection.

If you are setting up a Local Area VAXcluster (LAVc) or work group, you may need to designate someone as the network coordinator to help create and manage the work group, assign unique node names and addresses for each system, and provide administrative assistance to users. Call your service representative for network specific information.

If you are connecting a work group to an existing network, ask the network coordinator for the best way to connect to the larger network. Check that all node names and node addresses in your work group are unique and do not already exist in the larger network.

5.2.1 Verifying the Network Select Button Position

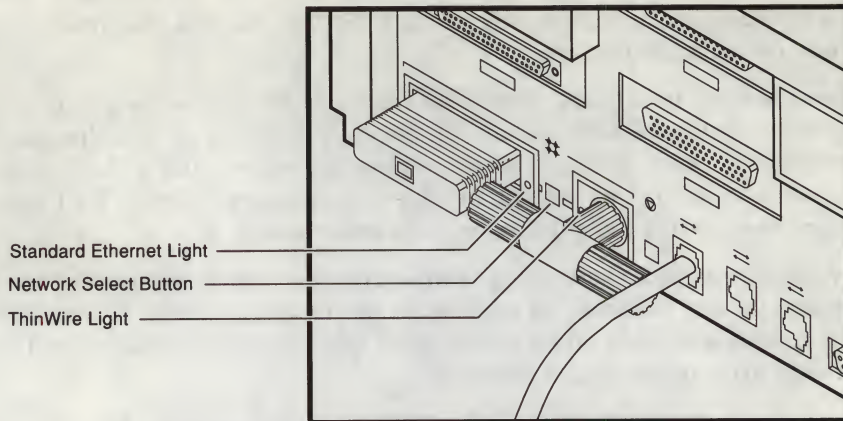
The ThinWire/Standard Ethernet network select button is usually set to the in position when you receive your system.

- In — ThinWire Ethernet
- Out — standard Ethernet

When you turn on your system, the green light to the left of the ThinWire connector should be on, indicating that you are ready to connect to ThinWire Ethernet.

Figure 5-1 shows the location of the network select button and the ThinWire and standard Ethernet lights.

Figure 5-1: Network Select Button and Ethernet Lights



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5.2.2 Verifying Your ThinWire Ethernet Network Installation

To verify the ThinWire Ethernet installation, you need to be correctly connected to a ThinWire Ethernet network or you need the ThinWire Ethernet terminator attached to your system unit.

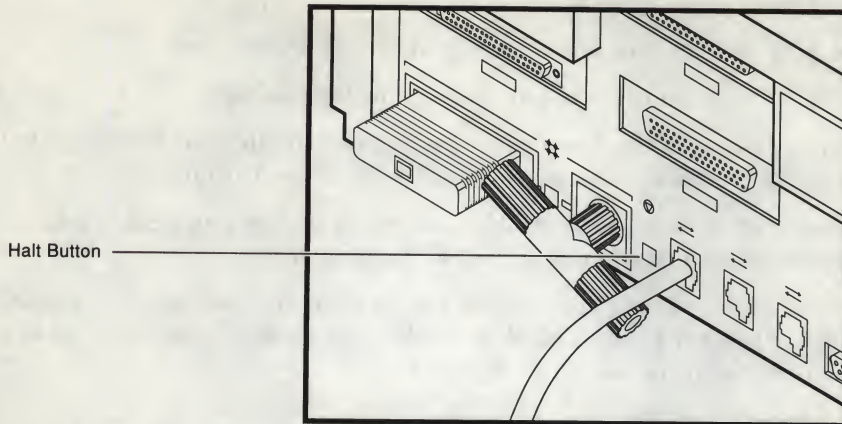
1. Turn on your system. A power-up display similar to the following appears:

```
F...E...D...C...B...A...9...8...7...6...5...4...3...2...1
```

2. The console prompt (>>>) appears. If the console prompt does not appear, press the halt button on the back of the system unit.

Figure 5-2 shows the location of the halt button.

Figure 5-2: Halt Button



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3. Enter SHOW ETHERNET at the console prompt.

```
>>> SHOW ETHERNET 
```

The Ethernet hardware address is displayed in the following format:

ID XX-XX-XX-XX-XX-XX

For example:

ID 08-00-2B-07-A7-80

4. Write your Ethernet hardware address here:

Ethernet hardware address 08-00-2B-18-C6-BC

You will need the hardware address for each system when you configure the software for your system in a Local Area VAXcluster (LAVc).

5. Enter TEST 50 at the console prompt. If the last line of information in the display is NI 0100.0001, then the Ethernet subsystem is working.

If a number between 0100.0002 and 0100.7000 appears on that line of the display, there is a failure in the Ethernet subsystem.

If NI 0100.7000 or any number above 0100.7000 appears on this line, check all Ethernet connections.

5.2.3 Connecting Your System to ThinWire Ethernet Cable

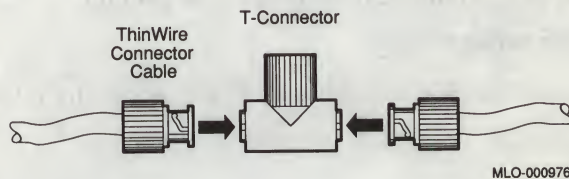
To connect a MicroVAX 3100 or VAXserver 3100 system to ThinWire Ethernet cable:

1. Set your system unit on/off switch to the off (0) position.
2. Attach ThinWire cable to one side of the T-connector.
3. If your system is the first or last system in a single ThinWire segment, leave the terminator attached to one side of the T-connector.

A segment is a length of cable made up of one or more cable sections connected with barrel connectors or T-connectors.

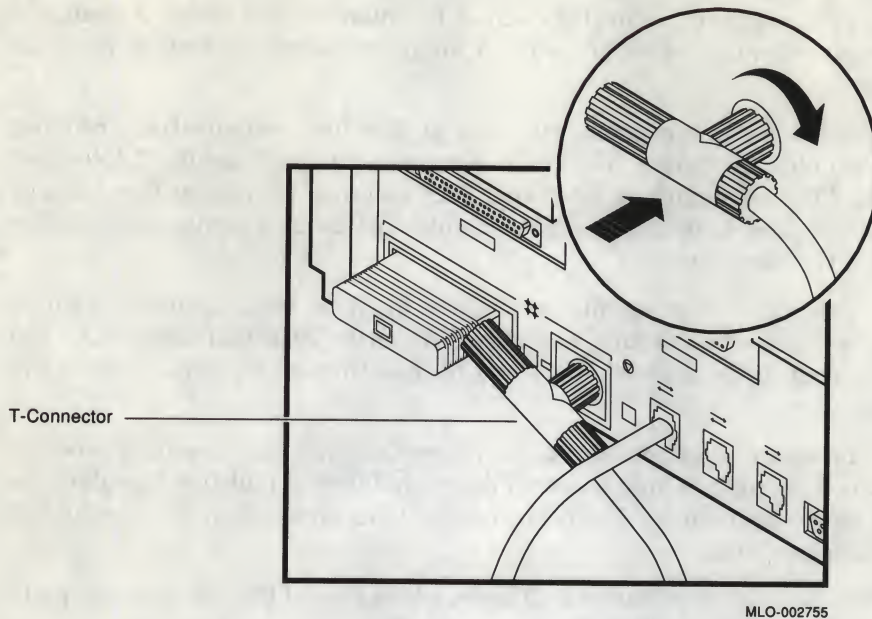
4. If your system is not the first or last system and you want to connect another system to the ThinWire cable, add another section of cable to the T-connector as shown in Figure 5-3.

Figure 5-3: Adding ThinWire Cable



5. Make sure that a T-connector is attached to the back of your system. Push the T-connector onto the system unit BNC connector and then turn it clockwise until it locks in place. See Figure 5-4.

Figure 5-4: Connecting the T-Connector to the Back of the System Unit



5.3 Creating a Daisy-Chained Work Group

A daisy-chained work group is created by serially connecting several systems together on the same ThinWire segment. This segment can function as a standalone network or it can be connected to a larger network.

The daisy-chain configuration lowers the cost of wiring, but there is a risk that someone might improperly unplug a system and make the network connections inoperative between systems on the same ThinWire segment.

5.3.1 Connecting Your System to a DECconnect Faceplate

If your office has been wired with DIGITAL DECconnect products, then connect your system to the DECconnect faceplate in your office. A faceplate is a wall receptacle that provides a single network connection for your system.

DECconnect cabling components support network configurations ranging from simple standalone ThinWire networks to multi-media LANs that connect PCs, workstations, and other VAX systems. No matter how large or how small your network, the most visible DECconnect component in your office is the faceplate.

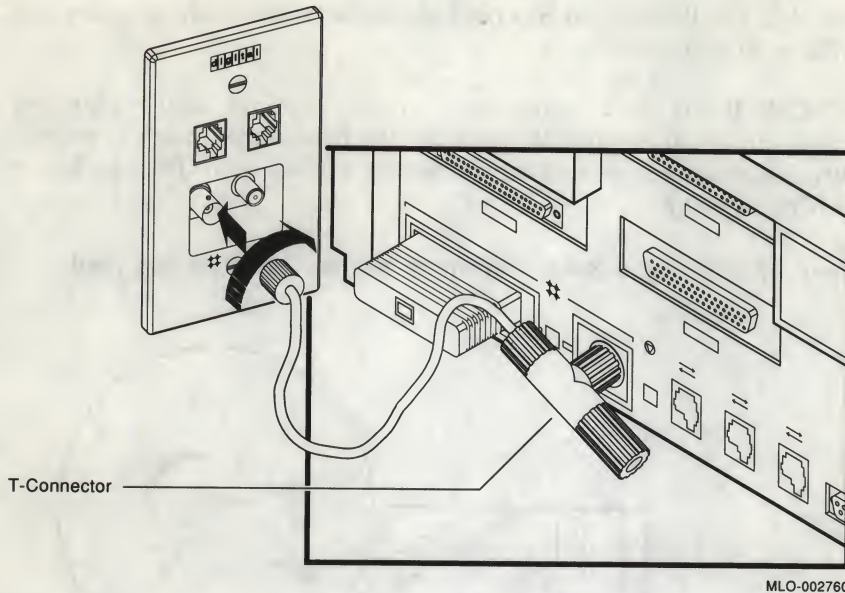
- A faceplate may contain a single ThinWire BNC connector which permits several systems, including VAXserver 3100 and MicroVAX 3100 systems, to be daisy-chained one to the other on the office side of the faceplate.
- A faceplate may contain a ThinWire Ethernet daisy-chain connector which permits behind-the-wall daisy-chaining of multiple faceplates to a single segment of ThinWire cable. One system can be attached to each faceplate.

Your network coordinator will know which type of DECconnect faceplate you have in your office.

To connect your system, attach one end of the ThinWire cable to the office side of the DECconnect faceplate. Attach the other end of the ThinWire cable to the ThinWire port on the back of your system unit.

Figure 5-5 shows a MicroVAX 3100 system plugged into a DECconnect office faceplate.

Figure 5-5: Connecting Your System to a DECconnect Faceplate



5.3.2 Troubleshooting the ThinWire Segment

If you have verified your ThinWire Ethernet installation and have found problems, use the following checklist to make sure all connections are correct:

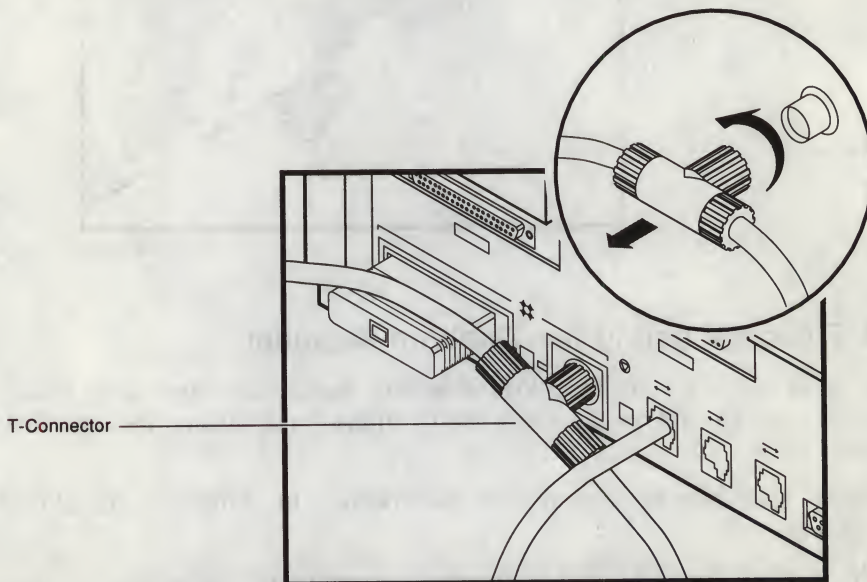
1. Check that all connections are secure on the ThinWire Ethernet segment.
2. Check that there is a T-connector between the connector on the ThinWire cable and the system unit.
3. Check that there is no ThinWire segment between the system and the T-connector. (The T-connector must attach directly to the system.)
4. Check that there are no branches off a ThinWire segment except through a DEMPR (DIGITAL Ethernet Multi-port Repeater).

A DEMPR provides eight ThinWire Ethernet drops from a single standard Ethernet connection.

5. Check that a ThinWire segment is not looped from one port on the DEMPR to another port on the DEMPR.
6. Check that the T-connector has not been disconnected from an operating ThinWire Ethernet segment.

CAUTION: *If you need to remove a system from an active ThinWire segment, simply disconnect the center of the T-connector from the system. Figure 5-6 shows the correct way to remove a T-connector from an active ThinWire segment.*

Figure 5-6: Removing a System from an Active ThinWire Segment



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7. Check that you have not disconnected a terminator from an active ThinWire segment. This would disrupt network operation.

After you have checked all ThinWire Ethernet connections, retest the Ethernet. Enter the following command at the console prompt:

```
>>> TEST 1 Return
```


or

```
>>> T 1 Return
```

The resulting display tells you if your connection is established; (1...) and then the console prompt (>>>) appears. If a connection is not established, the following message appears:

```
? 84 FAIL
```

5.4 Connecting to a Standard Ethernet Network

If you are setting up a Local VAXcluster (LAVc), you will need to designate someone as the network coordinator to manage the network, assign unique node names and addresses for each system, and provide administrative assistance to users.

If you are connecting a work group to an existing network, ask the network coordinator for the best way to connect your work group to the larger network. Have the network coordinator check that all node names and node addresses are unique and do not already exist in the larger network.

5.4.1 Setting the Network Switch for Standard Ethernet

To use standard Ethernet on your system, press in the Ethernet switch on the back of the system unit. When you turn on your system, the green light near the standard Ethernet connector comes on and the ThinWire Ethernet is off. You are ready to connect to standard Ethernet.

5.4.2 Verifying Your Standard Ethernet Network Installation

To verify standard Ethernet installation, you need the 15-pin standard Ethernet loopback connector attached to your system unit.

1. Turn on your system. A power-up display similar to the following appears:

```
F_..E...D...C...B...A...9...8...7...6...5...4...3...2...1
```

2. The light at the end of the loopback connector should be on.
3. The console prompt (>>>) appears.

Enter the SHOW ETHERNET command.

```
>>> SHOW ETHERNET Return
```

The Ethernet hardware address is displayed in the following format:

ID XX-XX-XX-XX-XX-XX

For example:

ID 08-00-2B-02-CC-71

4. Write down your Ethernet hardware address here. Each Ethernet hardware address is unique.

Ethernet hardware address 00-00-2B-10-C6-BC

You will need the hardware address for each system when you configure MicroVAX 3100 or VAXserver 3100 systems in a LAVc.

5. Enter TEST 50 at the console prompt. If the last line of the display is NI 0100.0001, then the Ethernet subsystem is installed and working.

If a number between 0100.0002 and 0100.7000 appears on this line, there is a failure in the Ethernet subsystem.

If NI 0100.7000 or any number above 0100.7000 appears on that line, check all Ethernet connections.

6. After successful completion of the power-up self-test and verification of the network, remove the loopback connector and store it for future diagnostic testing. Skip the next section and connect your system to a transceiver cable.

5.4.3 Troubleshooting Standard Ethernet

If data appears on the last line of information above the console prompt >>> in your standard Ethernet TEST 50 display:

1. Make sure the loopback connector is securely connected to the system.

However, if you are connected to an active Ethernet segment, your system can be tested without a loopback connector.

2. Turn off your system and turn it on again. Ethernet connection is verified during the power-up sequence.
3. After you have checked all Ethernet connections, retest the Ethernet subsystem. Enter the following command at the console prompt:

>>> **TEST 1** Return

4. If a connection has been established, the following is displayed:

1...

5. If a connection is not established, the following is displayed:

```
? 84 FAIL  
>>>_
```

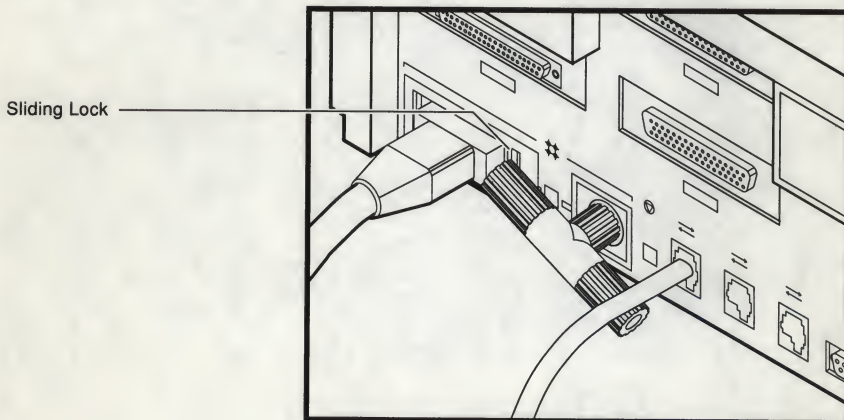
5.4.4 Connecting a Transceiver Cable to Your System

A transceiver cable is the physical connection between a standard Ethernet network interface and a MicroVAX 3100 or VAXserver 3100 system. You use a transceiver cable when you want to connect your system to an H4000 transceiver or DELNI which is attached to the standard Ethernet cable. To connect a transceiver cable to your system:

1. Set the system unit on/off switch to off (0).
2. Attach the 15-pin connector on the standard Ethernet transceiver cable to the back of the system unit.
3. Use a screwdriver to move the sliding lock (part of standard Ethernet connector) and make the standard Ethernet connection secure.

Figure 5-7 shows the correct connection.

Figure 5-7: Connecting a Transceiver Cable



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Chapter 6

Handling Problems

If a problem arises, you must first make sure that all power and SCSI cables are properly connected. Follow these steps to check the cables:

1. Turn off the terminal and all peripheral devices such as printers and modems.
2. Turn off all expansion boxes.
3. Turn off the system unit.
4. Check that the following cables are correctly connected at both ends:
 - Console cable (linking the local terminal to the system unit)
 - Terminal power cord
 - System power cord
 - Expansion box connector cable to system unit
 - Expansion box power cord

At this point all components should be off and any problem caused by badly connected cables remedied. Now, set the on/off switches on your equipment to 1 (on), in the order given in the following list.

1. Turn on expansion boxes in the following order:
 - RZ55 hard disk expansion box
 - TK50Z tape expansion box
 - RRD40 compact disc expansion box
2. Turn on the printer and modem, if you have this equipment.
3. Turn on the terminal.
4. Turn on the system unit.

The power-up test display should appear. If it does not, see Section 6.1, How to Use the Troubleshooting Table.

6.1 How to Use the Troubleshooting Table

Table 6-1 suggests corrective actions for certain system problems. When you have a problem, perform the following steps:

1. Note the symptoms of the problem.
2. Check the symptom column in Table 6-1 for a match.
3. Check the conditions for that symptom in the Possible Cause column. If more than one possible cause is given, check the possible causes and their suggested solutions in the order listed.
4. Follow the advice in the Suggested Solution column.
5. See Section 6.10, Service Information, if the problem persists.

Table 6-1: Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
System Problems		
System unit fan is off. Power light is off.	Power cord not connected.	Check power cord connections at both ends. Try a lamp that you know works in the power socket.
	Power socket may not be working.	Turn the system off for 10 seconds and then turn it back on. Unplug the terminal cable, communications cable, and printer. Then plug all cables back in and power up the system.
Power-up display does not show after 20 seconds.	Terminal cable not connected.	Check that the terminal cable is plugged in at both ends.
	Power socket may not be working.	Try a lamp that you know works in the socket.
	The terminal fuse may have blown.	Check the brightness and contrast controls. Replace blown terminal fuse.
	Terminal settings may be incorrect.	See the terminal documentation. The terminal should be set at 9600 baud, 8 bits, and no parity.

Table 6-1 (Cont.): Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
System Problems		
	Problem with console port.	Power down the system. Check the position of the Break Enable switch on the back of the system box ¹ . See Figure 2-2. It should be in the down position if a terminal connected to MMJ port 1 is used as the console device. It should be in the up position if a terminal connected to MMJ port 3 is used as the console device. Confirm that the terminal has no output when connected to either port.
Power up display contains question marks or asterisks.	Possible hard disk error.	If question marks or asterisks appear with any numbers in the power-up display, see the self-tests and the system exerciser in this chapter for further test instructions.
Operating system software display does not appear on the screen.	System default flags have to be set.	See Section 2.4 and Appendix A.
	Operating system software is not installed.	See the operating system software documentation for installation instructions. See the self-test and system exerciser descriptions in this chapter for further test instructions.
	Power cable and data cable are not installed correctly.	Check that power cable and data cable are installed correctly at both ends.

¹The position of the BREAK ENABLE switch is only read during power up.

Table 6-1 (Cont.): Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
System Problems		
	Default recovery may be set to halt.	Check that the default recovery action is not set to halt. See Section A.1.2 for further information on the default recovery action.
DSH32-B Communications module Problems		
Terminal does not operate.	Terminal cable, concentrator, or concentrator cable not properly connected.	Check all cable connections at both ends.
	Problem with DSH32-B asynchronous driver or MMJ port.	Try connecting the terminal to another system. If that works, the port to which the terminal was connected is faulty. If it still does not operate, the terminal is faulty. In either case, call your Field Service representative.
	Faulty cable concentrator or cable.	Connect the cable and concentrator to another system. If the connected terminals work, the DSH32 asynchronous port is faulty. Otherwise, either the cable or concentrator is faulty. Call your Field Service representative.
Problem with DSH32-B synchronous communications.	Synchronous cable not connected properly or problem with the DSH32-B communications module.	Check the cable connections at both ends. Try a different cable. If the problem persists, call your Field Service representative.
RRD40 Problems		

See the documentation supplied with your RRD40.

Table 6-1 (Cont.): Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
RZ55 Problems		
RZ55 fails system exerciser test and power-up self-test.	Faulty disk drive assembly. No AC power. Faulty cabling.	<p>Check that all cables are secure at both ends. Check to see if the activity light comes on or if the fan is blowing (AC power is present).</p> <p>Remove the defective RZ55 expansion boxes from the system. Call your field service representative.</p>
TZ30 Tape Drive Problems		
TZ30 tape drive green light flashes rapidly.	The drive mechanism is faulty or the tape cartridge is damaged.	Press and release the unload button to clear the fault. If the condition persists, do not attempt to remove the tape cartridge or use the tape drive. Call your service representative.
TZ30 passes power-up test but does not operate.	No cartridge in drive or the cartridge is not loaded.	Insert the cartridge and press the unload button.
Cartridge release lever does not slide.	Cartridge is in use.	Wait for green light to go on and try again. If the problem persists, do not use the drive. Call for service.
Cartridge release lever does not lock.	Cartridge is not inserted properly.	Reinsert the cartridge. If the problem persists, call for service.
Tape does not load.		Press and release the unload button. Wait for green light to go on before sliding lever and removing tape. If the light blinks, call for service.

Table 6-1 (Cont.): Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
TK50Z Tape Drive Problems		
TK50Z tape drive red light flashes rapidly.	The drive mechanism is faulty.	Press and release the load/unload button four times to clear the fault. If the condition persists, do not attempt to remove the tape cartridge or use the tape drive. Call your service representative.
TK50Z passes power-up test but does not operate.	No cartridge in drive or the cartridge is not loaded.	Insert the cartridge and press the load/unload button.
Cartridge release handle does not lift.	Power-up display is still in progress.	Wait for the red light to go out and try again. If the problem persists, do not use the drive. Call for service.
Cartridge release handle does not lock.	Cartridge is not inserted properly.	Reinsert the cartridge. If the Problem persists, call for service.
Tape does not load.	The load/unload button is in unload position.	Put load/unload button in load position. Wait for light to go out before removing tape.
Unable to access information on tape.	SCSI ID may be incorrect.	See Chapter 4 and Appendix B for additional information.

6.2 Power-Up Error Messages

MicroVAX 3100 and VAXserver 3100 systems display important information during the power-up test sequence. If the sequence displayed during power up contains double question marks or asterisks, failures may exist in the system. Use Table 6-2 to identify the faulty device. An asterisk indicates that a Read Only Memory (ROM) has been found for the option, but no test code exists.

NOTE: *If your terminal does not display any information on the screen after the power-up test sequence (approximately 1 second), you may have a terminal or system board failure. Check Table 6-1, the basic troubleshooting table.*

A single question mark indicates status information. Some common power-up status messages are:

1. System clock not set

? E 0040 0000.0005

You can set the clock when you enter program mode (while the operating system is running); see your operating system software documentation for instructions.

2. Low battery

? D 0050 0000.0005

The system battery's charge is low or completely discharged. Run the system for about 17 hours to fully recharge the battery.

If you see single question marks on the power-up display, especially next to a 7 or 6 (SCSI bus controller tests), but operation of the system seems normal, continue to use the system. If you continue to see errors of this type during the power-up display, use the information in the rest of this chapter to solve the problems. See Section 6.6 for information on using the system exerciser. If the system continues to display error information or fails to operate normally, call your service representative.

A double question mark indicates a "hard" error. This indicates a serious problem that may affect normal operation and use of some component of the system. For example:

3. No Ethernet cable

?? 1 00C0 0000.7004

This message indicates that the Ethernet subsystem is present in the system, but that

- No cable is installed on the ThinWire/standard Ethernet connectors.
- No loopback connector on the standard Ethernet port.
- No terminator on the ThinWire Ethernet port.
- Ethernet switch set to wrong position.
- Faulty cable.

Table 6-2: Power-Up and Self-Test Display Identifiers

Test Identifier	Device
F	Reserved for later use
E	System clock
D	Nonvolatile RAM
C	Serial line controller
B	Memory
A	Memory-management unit
9	Floating point unit
8	Interval timer
7	SCSI-A bus controller
6	SCSI-B bus controller
5	Interrupt controller and Ethernet ID ROM
4	DSH32-B communications module asynchronous lines
3	DSH32-B communications module synchronous lines
2	Reserved for later use
1	Ethernet network interconnect (NI)

6.3 Self-Tests

Self-test diagnostic programs reside permanently in your system's read-only memory (ROM). You can run self-tests from the terminal. Enter TEST 50 or T 50 and press RETURN after each self-test to display the status of the device tested.

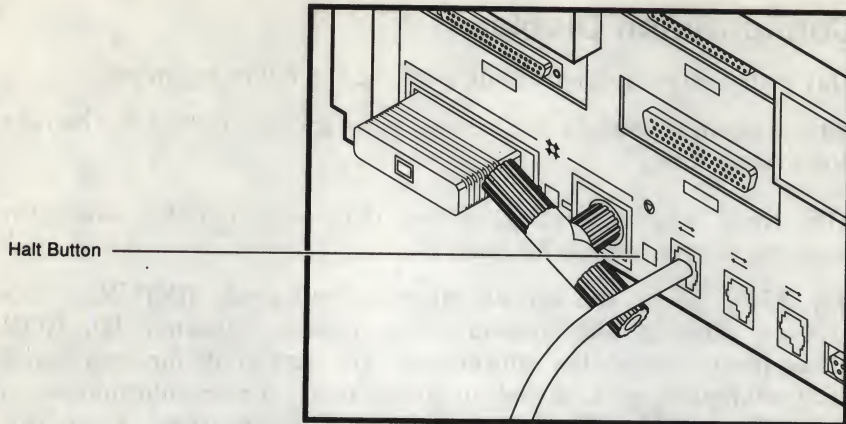
To test a device in your system, perform the following steps:

1. Use Table 6-2 to find the number or letter that represents the device you want to test.

NOTE: Read your operating system documentation for shutdown procedures before halting the system.

2. Put the system in console mode by pressing the halt button on the back of the system. Use a pen or a small pointed object to press the button. Figure 6-1 shows the location of the halt button.

Figure 6-1: Halt Button



MLO-002754

3. Enter **TEST** or the letter **T**, and a space followed by the appropriate number or letter:

```
>>> TEST 7 Return  
>>>
```

If you want to test a consecutive series of devices, enter **TEST** followed by the first and last numbers of the series:

```
>>> TEST F 7 Return  
>>>
```

The system displays the number of each device as it is tested, followed by a series of periods.

If the self-test is successful, no question mark or error message is displayed, and the console prompt appears:

```
7...  
>>>
```

If a device fails the self-test, a failure message is displayed before the console prompt is returned.

```
7?...  
84 FAIL  
>>>
```

If a self-test results in a failure, run the configuration display to show any error codes.

6.4 Configuration Display

To display your system configuration, perform the following steps:

1. Put the system in console mode by pressing the halt button on the rear of the system unit.

NOTE: *Read your operating system documentation for shutdown procedures before halting the system.*

2. Enter TEST 50 at the console prompt, and press RETURN. This procedure displays the system configuration, Ethernet ID, ROM revision levels, and status information. The mnemonic for each device in the configuration is listed in Table 6-3. Error information in this display is valuable to your service representative. Have this information ready if you must call for service. See Chapter 4 and Appendix B for additional information.

>>> **TEST 50** Return

KA41-A V1.3

ID 08-00-2B-03-79-1F

```
CLK          0000.0001①
NVR          0000.0001
DZ           0000.0001
00000001 00000001 00000001 00000001 00000000 00000000
②         ③         ④         ⑤         ⑥         ⑦
MEM          0004.0001⑧
00400000
MM           0000.0001
FP           0000.0001
IT           0000.0001

SCSI-A       7711.0001 V0.1
004C437 0004C437 00000000 00000000
SCSI-B       1C1C.0001 V1.0
FFFFFF03 FFFFFFF05 . . . 05000001 . . . FFFFFFF03 FFFFFFF05

SYS          0000.0001
DSH32-A     00FF.0001 V2.0
DSH32-S     0000.0001 V2.0
NI           0000.0001
>>>
```

- ① Normal processing code
- ② MMJ port 1 status
- ③ MMJ port 2 status
- ④ Modem port status
- ⑤ MMJ port 3 status
- ⑥ Unused
- ⑦ Unused
- ⑧ Represents 4Mb of memory

Table 6-3 lists the mnemonics for devices that may be installed in your system.

Table 6-3: Definition of Mnemonics

Mnemonic	Device
CLK	System clock
DZ	Serial line controller
FP	Floating point unit
SCSIA	SCSI-A controller
SCSIB	SCSI-B controller
IT	Interval timer
MEM	Memory
MM	Memory-management unit
NI	Network interconnect
NVR	Nonvolatile RAM
SYS	Interrupt controller and Ethernet ID ROM
DSH32-A	DSH32-B communications module asynchronous lines
DSH32-S	DSH32-B communications module synchronous lines

6.5 Displaying Device Information

To determine what devices are installed in your system and their SCSI bus ID assignments, enter the SHOW DEVICE command at the console prompt:

```
>>> SHOW DEVICE Return
>>> _
```

You will see a display similar to the following:

VMS/VMB	ULTRIX	ADDR	DEVTYPE	NUMBYTES	RM/FX	WP	DEVNAM
ESA0	SE0	08-00-2B-07-E3-83					
DKA300	RZ5	A/3/0/00	DISK	104 MB	FX		RZ23
MKA500	TZ5	A/5/0/00	TAPE	RM	WP	
...HostID....		A/6	INITR				
DKB200	RZ10	B/2/0/00	DISK	104 MB	FX		RZ23
DKB300	RZ11	B/3/0/00	DISK	104 MB	FX		RZ23
DKB400	RZ12	B/4/0/00	RODISK	593 MB	RM	WP	RRD40
...HostID....		B/6	INITR				

>>>

- ① Device numbers for VMS operating system
- ② Device numbers for ULTRIX operating system
- ③ Address
- ④ Device type
- ⑤ Number of megabytes
- ⑥ Removable or fixed disk
- ⑦ Write-protected
- ⑧ Device name

6.6 Using the System Exerciser

The system exerciser emulates an operating system through interaction among devices within the system. The system exerciser tests all internal and external devices. Use the system exerciser if your system has intermittent problems. The system exerciser takes up to 11 minutes to complete and will not write on any media.

If you suspect problems, use the system exerciser to check the quality of your software media. Insert a blank tape into the TZ30 or TK50Z tape drive and the RRD40 test disc into the RRD40 compact disc drive before running the system exerciser.

NOTE: Read your operating system documentation for shutdown procedures before pressing the halt button.

To test your system, perform the following steps:

1. Use the TEST 50 command to display your configuration. Check that all devices are present in the configuration display.
2. Put the system in console mode by pressing the halt button on the rear of the system and then pressing RETURN.
3. Enter the TEST 0 command as follows:

>>> **TEST 0** Return

The following example shows the display that appears after the system exerciser has run all tests. There is an error message for the RRD40 compact disc drive. If you get such an error message, contact your service representative.

>>> **TEST 0** Return

```
KA41-A  V1.3          01      CU
F 00B0  MONO          0000.0001  11 1005      0 00:00:35
C 0080  DZ            0000.0001  14           0 00:01:12
B 0010  MEM           0137.0001   5 00A7      0 00:02:02
7 0090  SCSI-A        6000.0001  22 0002      0 00:02:23
                        3200.0001
6 00A0  SCSI-B        6000.0001  15 0002      0 00:02:56
                        2200.0001
                        3200.0001
                        4101.0471 ①
                        7200.0001
4 81F0  DSH32-A       00FF.0001
                        0001.0001
                        0001.0001
                        0001.0001
                        0001.0001
3 81F1  DSH32-S       0001.0000
                        0000.0001
1 00C0  NI            0000.0001   9           0 00:04:01
② ③ ④ ⑤ ⑥ ⑦ ⑧
00 0.00:08:14
?06 HLT INST
PC - 00005A0F
```

- ① Example of RRD40 error code
- ② Device identifier
- ③ Status indicators (if any)
- ④ Mnemonic for the device

- ⑤ Error or status information for each device
- ⑥ Number of times device was tested
- ⑦ Progress count (indicates progress within some tests)
- ⑧ The time (days hours:minutes:seconds) of the last test pass.

Single question marks provide status information and do not interfere with the operation of the system; double question marks (??) indicate errors which affect system operation.

If you get double question marks next to the tape drive mnemonic on SCSI-A or SCSI-B bus, and you ran the system exerciser with media in the drive, try a different tape cartridge. Your media may be the source of the problem.

If you get any other double question marks, call your service representative for assistance. Know the mnemonic associated with the question mark. Table 6-3 gives the device that corresponds to each mnemonic. Have this information ready when you call your service representative.

6.7 Test Utilities

If an expansion box fails, first check that all cable connections are in place.

6.7.1 RRD40 Test Disc Utility

The RRD40 compact disc expansion box is shipped with a test disc to be used when you suspect RRD40 compact disc drive problems. To test your RRD40, perform the following steps:

1. Press the halt button on the back of your system unit. The console prompt (>>>) is displayed on your screen.
2. Insert the test disc in the RRD40 following the instructions in Chapter 4 of this manual.
3. Type the TEST 0 command.
4. If a code other than 4100.0001 is displayed on the screen, there is a problem with the RRD40 compact disc drive. Do not use the drive, call your service representative for assistance. 4100.0001 is a normal response code.

6.7.2 SCSI Mass Storage Disk Data Eraser (TEST 75)

CAUTION: *The Disk Data Eraser erases all data on a specified hard disk. When using this utility, take particular care not to erase the operating system from your system disk, DKA300.*

1. Press the halt button on the back of your system unit. The console prompt (>>>) is displayed on your screen.
2. At the console prompt (>>>), enter SHOW DEVICE and press RETURN. See the section entitled Displaying Device Information for an example of the TEST 50 screen display.
3. Enter the TEST 50 command and press RETURN.
4. Identify on the screen display the SCSI ID of the hard disk you wish to erase.
5. Enter TEST 75 command and press RETURN.

The following example shows the erase disk utility formatting the hard disk in an RZ55 expansion box. The hard disk is located on SCSI-B bus address ID 1. The formatting procedure completes with a successful result.

>>> **TEST 75** Return

```
PV_SCS_FMT_CHN  (0=SCSIA, 1=SCSIB)?  1
PV_SCS_FMT_ID   (0,1,2,3,4,5,6,7)?  1
PV_SCS_FMT_RUSURE (1/0)?  1
PV_SCS_FMTING.....
PV_SCS_FMT_Brepl=0
PV_SCS_FMT_SUCC
>>>
```

- ① Select the SCSI-A bus or SCSI-B bus.
- ② Specify the SCSI ID.
- ③ Provide verification of your action, 1 = Yes; 0 = No.
- ④ Your hard disk is being erased. This operation takes approximately 20 minutes. Dots appear as the operation progresses.
- ⑤ Upon completion, the number of bad blocks is listed (0 = successful).
- ⑥ Your hard disk has been successfully erased.

The following is an example of running the erase disk utility on the hard disk located at SCSI address ID #3, SCSI-B bus, with an error.

```
>>> TEST 75 Return  
PV_SCS_FMT_CHN (0=SCSIA, 1=SCSIB)? 1  
PV_SCS_FMT_ID (0,1,2,3,4,5,6,7)? 3  
PV_SCS_FMT_RUSURE (1/0)? 1  
PV_SCS_FMTING.....?  
PV_SCS_FMT_ERR#3
```

Table 6-4 lists all the data erasure messages and gives an explanation for each message.

Table 6-4: Error Codes for Erase Disk Utility

Code	Description
1	Illegal unit number entered.
2	Error occurred during a SCSI bus command.
3	Reassign blocks failed (no more replacement blocks available).
4	Unit not ready.
5	Illegal device type for operation.

6.7.3 RX23 Diskette Formatting Utility

You can format your diskette through a software command (see your software documentation) or if you have not installed your software you can format a diskette by entering the following command at the console prompt and by answering the questions:

>>> **TEST 76** Return

KA41 RDRXfmt

VSfmt_QUE_unitno (0-3) ? **2** ①

VSfmt_VUE_RXmedtyp
(1=RX33), (2=RX23) ? **2** ②

VSfmt_QUE_RUsure (DUA2 1/0) ? **1** ③

VSfmt_sts_FMTing OK

VSfmt_STS_CKRXfmt OK

VSfmt_RES_Succ ④

- ① Enter 2 to format a diskette.
- ② Enter 2 to format a diskette.
- ③ Enter 1 to continue formatting, or 0 to discontinue formatting.
- ④ The diskette has been formatted.

6.8 Restarting the System After Running Tests

While running any of the tests or procedures in this chapter, your system is in console mode. To resume normal operation, you must reenter *program mode*. The two ways to do this are:

1. Enter **BOOT** at the console prompt and press **RETURN**. The system then searches each device in turn for operating system software.
2. Enter **BOOT** followed by a space and the name of the device that contains operating system software and then press **RETURN**, as shown in the following example:

```
>>> BOOT DKA300 Return  
>>> _
```

This procedure lets the system boot the operating system software immediately, without searching for the software.

For more information, see your operating system documentation.

6.9 Summary of Commands

The SET, TEST, and SHOW commands, and the tests or utility programs they execute, are shown in 6-5, Table 6-6, and 6-7. To see a list of these commands, enter HELP at the console prompt and press RETURN.

Table 6-5: Summary of SET Commands

Command	Default Set
SET BFLG	Default boot flags (operating system dependent)
SET BOOT	Default boot device
SET HALT	Default halt action
SET MOP	Enable/disable network listener
SET PSWD	Password for remote trigger verification
SET SCSIA	Set SCSI device ID number - bus A
SET SCSIB	Set SCSI device ID number - bus B
SET TRIG	Enable/disable remote system to request a local boot of a system

When the VAXserver 3100 is used as the boot member in a Local Area VAXcluster (LAVc), the system manager must enable the remote trigger, and give a password to each satellite node.

Table 6-6: Summary of TEST Commands

Command	Test or Utility Program
TEST F	Reserved for later use.
TEST E	System clock
TEST D	Nonvolatile RAM
TEST C	Serial line controller
TEST B	System Memory
TEST A	Memory-management unit
TEST 9	Floating point unit
TEST 8	Interval timer
TEST 7	SCSI-A bus devices

Table 6-6 (Cont.): Summary of TEST Commands

Command	Test or Utility Program
TEST 6	SCSI-B bus devices
TEST 5	Interrupt controller and Ethernet ID ROM
TEST 4	DSH32-B communications module asynchronous lines
TEST 3	DSH32-B communications module synchronous lines
TEST 2	Reserved for later use
TEST 1	Ethernet network interconnect
TEST 0	System exerciser
TEST 50	Configuration display
TEST 51	NVR default boot device
TEST 52	NVR default boot flags
TEST 53	Set NVR default recovery action flags
TEST 73	Special key on tapes
TEST 74	Special key on diskettes
TEST 75	SCSI disk data eraser
TEST 76	SCSI diskette formatter

Table 6-7: Summary of SHOW Commands

Command	Information Displayed
SHOW BFLG	Default boot flag
SHOW BOOT	Default boot device
SHOW DEVICE	Devices available and SCSI ID
SHOW ESTAT	Results of last system exerciser test
SHOW ETHER	Hardware Ethernet address
SHOW HALT	Default action after your system halts
SHOW MEMORY	Memory for your system unit
SHOW MOP	State of listener bit (enabled by default)
SHOW SCSI A	SCSI device ID number - bus A
SHOW SCSI B	SCSI device ID number - bus B
SHOW TRIG	State of remote trigger enable
SHOW VER	Version of ROM

6.10 Service Information

If you have followed the corrective actions listed in this chapter and you continue to have problems with your system, call your DIGITAL service representative.

Before you call:

1. Write down the serial and model numbers of your system. Your system is identified on the back of the system unit with a label, for example:
 - Model: DV-31AT1-A9, is a MicroVAX 3100 Model 10 multiuser system.
 - Model: DV-31ASB-A9, is a VAXserver 3100 Model 10 system.
 - Model: DV-31BT1-A9, is a MicroVAX 3100 Model 20 multiuser system.
 - Model: DV-31BSB-A9, is a VAXserver 3100 Model 20 system.

Your service representative may need this number when you call.

2. Make notes based on the troubleshooting chart at the beginning of this chapter. This information may tell your DIGITAL service representative the state of your system when the problem occurred.
3. Be prepared to read information from the screen and to enter commands at the keyboard while you talk to your DIGITAL service representative on the telephone.
4. Eight recessed lights on the back of the system unit light up when you turn on the system. Write down the status of these lights and have the information available to give to your DIGITAL service representative when you call. Your DIGITAL service representative may ask you to describe which lights are lit.

Appendix A

System Parameters

This appendix describes how to customize your system's startup procedures, including how to:

- Set the hardware to boot the operating system software from a device other than the system disk
- Set your system to have a particular mode of action should the system lose power
- Set the default boot flags for your software
- Set a remote trigger to permit a remote system to request a local boot of the system

A.1 Booting the System

Booting your system means an internal program attempts to load the operating system software from a mass storage device.

A.1.1 Set the Default Boot Device

Set the default boot device to the disk drive on which the operating system is installed. Your operating system may have been installed on the system disk before it left the factory. If so, the MicroVAX 3100 or VAXserver 3100 system can be booted from that device at startup, using the console program BOOT command.

If you install a higher version of the operating system on another device, or if you have copied it from one device to another, you must set the default boot device to the new device. The operating system software can reside in one of the following places:

- On a hard disk in the system unit
- On a hard disk in an expansion box
- On a compact disc

- On a remote system that you access through the Ethernet.

Table A-1 shows the names assigned to each of the possible devices. Note that *x* refers to any number 0 through 7. The default boot device should be set to one of the listed device names. The system disk for a MicroVAX 3100 or VAXserver 3100 system is usually DKA300.

Table A-1: SCSI Boot Device Names

Device and Location	VMS Device Name	ULTRIX Device Name
Hard disk in system unit (SCSI-A bus at IDx 0-7)	DKAx00	RZxx
Hard disk in system unit (SCSI-B bus at IDx 0-7)	DKBx00	RZxx
Hard disk or compact disc in expansion box (SCSI-B bus at IDx 0-7)	DKBx00	RZxx
Mass storage on remote system	ESA0	SE0
Tape (SCSI-A bus at IDx 0-7)	MKAx00	TZxx
Tape (SCSI-B bus at IDx 0-7)	MKBx00	TZxx

To change the default boot device:

1. Check to be sure your system is in console mode. If the console prompt (>>>) does not appear on the screen, press the halt button on the rear of the system unit.

NOTE: *If the system is running, the system displays the following information:*

```
?02 EXT HLT
PC = 000158E
>>>_
```

2. At the console prompt, enter SET BOOT and the name of the default boot device on which the software will reside, for example:

```
>>> SET BOOT DKA300 Return
>>>_
```

If you enter SHOW BOOT at the console prompt, the name of the default boot device appears, for example:

```
>>> SHOW BOOT Return
DKA300
>>>_
```


To reset the boot device to the default ESA0, enter SET BOOT and "." at the console prompt as follows:

```
>>> SET BOOT "." Return
>>> _
```

A.1.2 Changing the Default Recovery

When you receive your system, it is set to automatically run the power-up tests and then display the console prompt (>>>) at power up or following an operating system failure. You can change this default to suit your requirements.

NOTE: Check your operating system documentation for shutdown procedures before halting your system.

The options for setting the default recovery action and what they mean are listed in Table A-2. Default values or settings are the "normal" or "expected" values that are automatically included in a command.

Table A-2: Values for Default Recovery

Default Default Recovery			User Action
Value	Action	Result	
1	Automatic restart	System restarts automatically. Ideal for the MicroVAX 3100 multiuser system.	None
2	Automatic reboot	Operating system software automatically reboots after every powerup. Ideal for VAXserver 3100 system.	None
3	Automatic halt	Console prompt (>>>) appears after every powerup.	Enter BOOT ¹

¹You must enter BOOT or BOOT and the device name (for example, BOOT DKA300) on which the operating system software resides followed by RETURN to boot the system from the device.

If you want to change the recovery action setting, follow these steps:

1. Put your system in console mode by pressing the halt button on the back of the system unit.
2. At the (>>>) prompt, enter the following:

```
>>> SHOW HALT Return
```

The value for the default recovery action appears:

```
2
>>>_
```

3. To set the recovery action to automatic restart should the system go down, at the (>>>) prompt, enter:

```
>>> SET HALT 1 
>>>_
```

4. To change to automatic reboot, at the (>>>) prompt, enter:

```
>>> SET HALT 2 
>>>
```

5. If you want your system to halt after every time you turn it on, at the console prompt (>>>) , enter:

```
>>> SET HALT 3 
>>>
```

A.1.3 Setting the Default Boot Flags

Default boot flags (used in specialized startup procedures) should be set for the operating system installed on your MicroVAX 3100 or VAXserver 3100 system. See your operating system documentation for more information.

To set the default boot flags:

1. Ensure the system is in console mode. If the (>>>) prompt does not appear on the screen, press the Halt button on the back of the system unit.
2. Determine the default boot flag number (a hexadecimal number of up to eight characters) from your operating system software documentation.
3. Set the default boot flags for your operating system. At the (>>>) prompt, enter:

```
>>> SET BFLG 
>>>_
```

A.2 MOP, TRIG and PSWD Commands

If the VAXserver 3100 is to be used as the server and operating system resource for members of a work group, the system manager can tell the server to boot the satellites from the server console without having to go to each satellite and boot them manually.

After initial setup, issue the following commands from the keyboard of each MicroVAX 3100 multiuser system:

1. SET MOP command enables or disables the network listener. SET MOP 1 enables the listener bit.

Enable the listener bit using the SET MOP command as follows:

```
>>> SET MOP 1 
>>> _
```

SET MOP 0 disables the listener bit.

2. The SET TRIG command allows a remote system to request a local boot of the system. SET TRIG 1 enables the remote system's request.

Go to each MicroVAX 3100 multiuser system and enable the state of the remote trigger using the SET TRIG command as follows:

```
>>> SET TRIG 1 
>>> _
```

SET TRIG 0 disables the remote systems request.

3. The password is set with the SET PSWD command. The value for the password can be any 16 hexadecimal characters, 0 through 9 and A through F. For security reasons, the password is one-way encrypted and cannot be displayed. In order to set a new password, the password must be known unless it is the first time the password is set.

```
>>> SET PASSWORD password
>>> _
```

To change a password, enter the SET PSWD command specifying first the new password followed by the old password.

```
>>> SET PASSWORD new_password old_password
>>> _
```

With the server booted, and the operating system and networking software installed and running, enter the following commands at the server keyboard:

```
$ MCR NCP 
NCP> TRIG NODE remote_system_name SERVICE_
PASSWORD- 
-NCP> your_password 
```

The remote system should boot.

As an alternative, the system manager can boot each of the systems in a work group by entering the following at each system keyboard:

```
>>> B ESA0 Return  
>>>
```


Appendix B

SCSI IDs

This appendix contains information common to both MicroVAX 3100 and VAXserver 3100 systems. The information is for technical users who wish to create custom configurations.

SCSI is the acronym for Small Computer Systems Interface. SCSI is an interface designed for connecting disks and other peripheral devices to computer systems. SCSI is defined by an American National Standards Institute (ANSI) standard and is used by many computer and peripheral vendors throughout the industry.

Up to eight SCSI devices can share a SCSI bus (a cable). All data is sent back and forth on the cable. Each SCSI device attached to the cable looks at all the data, but a SCSI device only takes the data that has the proper device identification (called a SCSI ID).

B.1 SCSI ID Default Settings

You are responsible for the SCSI ID settings on your equipment. Digital Equipment Corporation sets each SCSI device to a default setting before the equipment leaves the factory. You may never need to change a default setting. Default settings should only be changed when a system is configured with more than one of a particular device.

The SCSI ID numbers are 0 through 7; 7 is the highest ID. The number 7 is reserved for a device requiring the highest priority on the SCSI bus. The number 6 is reserved for the controller. Six IDs (0 through 5) are available for custom configuration.

SCSI default settings for both the MicroVAX 3100 and VAXserver 3100 systems are listed in Table B-1. The identification numbers listed give optimal performance on most systems. However, if you have special performance needs, you can set the identification number on each SCSI device manually. For most applications, SCSI IDs can be set arbitrarily as long as no two devices share the same ID.

Each device has a set of switches or jumpers that can be set for a specific ID. The TK50Z tape drive, the RZ55 hard disk drive, and the RRD40 compact disc drive are mounted in expansion boxes. Each of these devices have external switches which you can set.

The integral RZ23 hard disk, the TZ30 tape drive and the RX23 diskette drive have internal switches or jumpers. These must be reset by your DIGITAL service representative if you need to change their default settings.

B.2 Setting the SCSI ID

Enter the TEST 50 command at the console prompt (>>>), then press RETURN. Your system configuration is displayed on the screen.

Note that FFFFFFF05 identifies an open ID. See Table 4-2 for a complete list of the device status codes and their meaning. The system given in the example contains a controller, two RZ23 hard disks, one RRD40 compact disc drive expansion box and one TK50Z tape drive expansion box on the external SCSI-B bus. This leaves three open IDs. Of these, ID 7 is reserved for a device requiring the highest priority on the SCSI bus.

```
SCSI-B      1C1C.0001   V1.3
00000001  FFFFFFF05  00000001  00000001  05000001  01000000  FFFFFFF03  FFFFFFF05
  ①         ②         ③         ④         ⑤         ⑥         ⑦         ⑧
```

- ① SCSI ID 0 — RX23
- ② SCSI ID 1 — open
- ③ SCSI ID 2 — RZ23
- ④ SCSI ID 3 — RZ23
- ⑤ SCSI ID 4 — RRD40
- ⑥ SCSI ID 5 — TK50Z tape drive
- ⑦ SCSI ID 6 — SCSI-B controller
- ⑧ SCSI ID 7 — Reserved

Follow these rules when you set SCSI IDs:

- You can have up to seven devices on one bus.
- Each device must have its own unique identifier.

- Two devices may have the same identifier only if they are on different busses.
- Each SCSI bus must be terminated. Add a terminator to an unused SCSI port.

Table B-1: SCSI IDs for MicroVAX 3100 and VAXserver 3100 systems

SCSI-A Internal Bus	SCSI-B External Bus
7 Reserved for highest priority device	7 Reserved for highest priority device
6 SCSI-A controller	6 SCSI-B controller
5 TZ30, RZ23, RX23	5 TK50Z expansion box
4 Unused	4 RRD40 expansion box
3 RZ23 (system disk)	3 RZ23
2 Unused	2 RZ23
1 Unused	1 RZ55 expansion box
0 Unused	0 RZ23, RX23

NOTE: Proper operation of the SCSI bus requires that high-quality, properly configured cables and connectors be used to connect all devices. It is recommended that only DIGITAL-supplied cable assemblies intended for interconnecting SCSI devices be used. This ensures that the impedance characteristics, signal propagation velocity, inductance, capacitance, cross-talk, grounding, conductor pairing, and shielding meet the requirements for proper operation of the bus. In addition, it is recommended that all units on the SCSI bus be powered from a common AC power source. The proper operation of any SCSI bus that uses cable assemblies not supplied by DIGITAL, or that are not configured in accordance with DIGITAL's recommendations, is not guaranteed.

B.3 Setting SCSI Switches

SCSI IDs (addresses on SCSI bus) and the corresponding switch positions shown in the following tables are the possible IDs and switch positions for each expansion box.

Table B-2: RZ55 Expansion Box SCSI IDs and Switch Positions

SCSI-B ID on	Switch Positions - Switches 1, 2, and 3		
SCSI-B Bus	1	2	3
0	Down	Down	Down
1 ¹	Down	Down	Up
2	Down	Up	Down
3	Down	Up	Up
4	Up	Down	Down
5	Up	Down	Up
6	Up	Up	Down
7	Up	Up	Up

¹Recommended and default SCSI ID.

Table B-3: TK50Z Expansion Box SCSI IDs and Switch Positions

SCSI-B ID on	Switch Positions ¹ - Switches 1, 2, and 3		
SCSI-B Bus	1	2	3
0	Up	Up	Up
1	Up	Up	Down
2	Up	Down	Up
3	Up	Down	Down
4	Down	Up	Up
5 ²	Down	Up	Down
6	Down	Down	Up
7	Down	Down	Down

¹The TK50Z SCSI ID switch convention is the opposite to the convention on the other devices.

²Recommended and default SCSI ID.

Table B-4: RRD40 Expansion Box SCSI IDs and Switch Positions

SCSI-B ID on		Switch Positions - Switches 1, 2, 3, and 4			
SCSI-B Bus		1	2	3	4 ¹
0		Down	Down	Down	Not used
1		Down	Down	Up	Not used
2		Down	Up	Down	Not used
3		Down	Up	Up	Not used
4 ²		Up	Down	Down	Not used
5		Up	Down	Up	Not used
6		Up	Up	Down	Not used
7		Up	Up	Up	Not used

¹Switch 4 is not used but should be set to the down position.

²Recommended and default SCSI ID.

Appendix C

Options

This appendix describes the hardware options available to MicroVAX 3100 and VAXserver 3100 systems.

C.1 Adding Memory

Optional memory modules can be added to MicroVAX 3100 and VAXserver 3100 systems.

NOTE: *Additional memory modules must be installed by DIGITAL Field Service personnel only.*

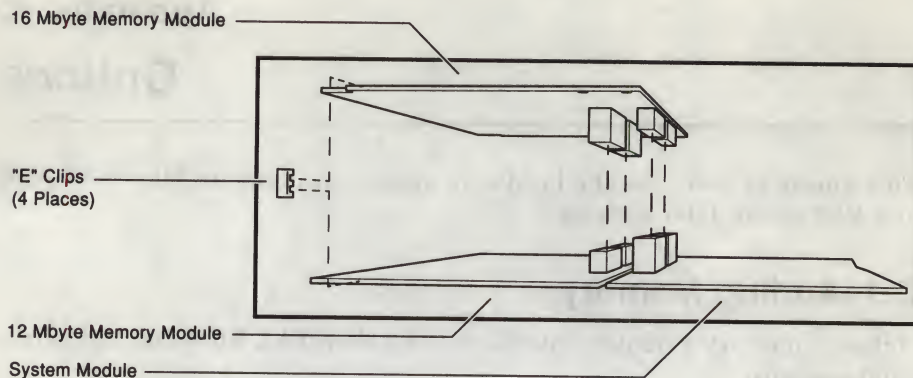
There are three memory modules available: 4Mb, 12Mb, and 16Mb modules. The 4Mb and 12Mb modules are physically the same. The 16Mb module is slightly larger than the other two and it contains two additional connectors that allow one of the other two memory modules to be connected piggyback style. This piggyback connection allows the 4Mb and 12Mb modules to increase the total memory in the system to 24Mb and 32Mb (including 4Mb on the system module). The additional memory expansion modules are shown in Table C-1:

Table C-1: Optional Memory Expansion Modules

Module Number	Description
MS42-AB	4Mb memory expansion module
MS42-BA	12Mb memory expansion module
MS42-CA	16Mb memory expansion module

Figure C-1 shows how the 4Mb or 12Mb modules are connected to the 16Mb module.

Figure C-1: 16Mb Memory Module



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C.2 Adding Communications Modules

The communications modules available to MicroVAX 3100 and VAXserver 3100 systems are shown in Table C-2.

Table C-2: Optional Communications Modules

Module Number	Description
DSH32-BA	DSH32-B communications module giving eight asynchronous lines and one synchronous line (RS232 compatible)
DSH32-BB	DSH32-B communications module giving eight asynchronous lines and one synchronous line (RS423 compatible)
DSH32-BC	DSH32-B communications module giving eight asynchronous lines and one synchronous line (RS422 compatible)

C.2.1 The DSH32-B Communications Module

The DSH32-B communications module is supplied as standard with some packaged MicroVAX 3100 systems but it is available as an option to other MicroVAX 3100 system configurations. The module, when used on its own, provides eight asynchronous lines and one synchronous line. The model is identified (defined) by the electrical interface of the synchronous line.

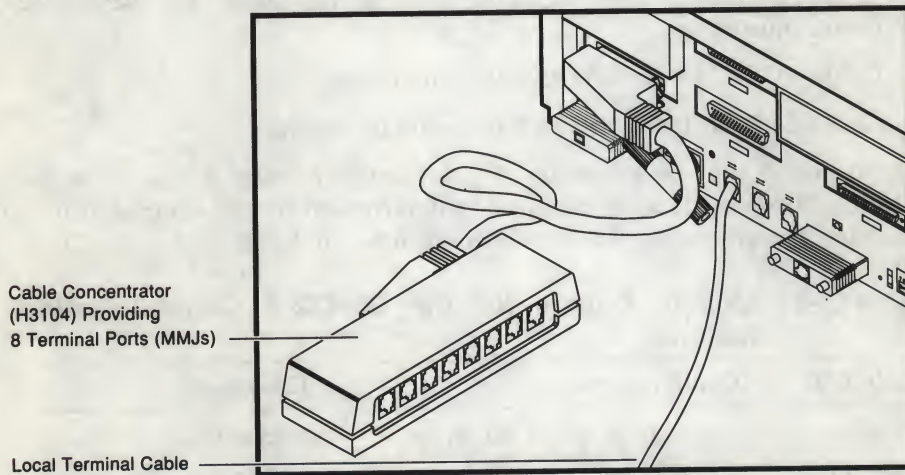
C.2.1.1 Connecting Terminals or Other Peripherals to the Eight-Asynchronous Port

The DSH32-B communications module is supplied with a cable concentrator and one 36-pin cable. The 36-pin cable can be used to connect the cable concentrator to the system unit. Terminals or other peripheral devices can then be connected.

The following procedure describes how to connect several terminals or other peripheral devices to the system unit using the cable concentrator:

1. Connect one end of the external 36-pin cable to the back of the cable concentrator.
2. Connect the other end of the 36-pin cable to the eight-asynchronous port on the rear of the system unit. See Figure C-2.

Figure C-2: Connecting the Eight Asynchronous Line Cable to the System Unit



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NOTE: *There are two versions of the eight-asynchronous cable. The 90 degree angled connector version is shown in Figure C-2, but there is also a straight connector version.*

3. Connect one end of each terminal or peripheral cable to one of the keyed MMJ ports on the cable concentrator. You can connect up to eight devices (terminals or peripherals) to the cable concentrator.

Use a cable coupler and additional lengths of DECconnect office cable to extend the cable to terminals that are not close to the system unit.

If the terminal or peripheral does not have an MMJ port, connect a 25-pin adapter (PN H8571A) to the cable. This adapter provides the necessary connector compatibility.

C.2.1.2 Connecting a Host Computer or Modem to the Synchronous Port

The DSH32-B communications module is supplied with a synchronous cable. The type of synchronous cable supplied should be compatible with the communications interface you are using.

NOTE: *Make sure the cable you have is the correct one for your application.*

The following cables are available for use with the DSH32-B:

- Cable BC19V-02 and RS232C adapter connector for RS232/V.24 communications
- Cable BC19U-02 for RS422/V.36 communications
- Cable BC19W-02 for RS423/V.10 communications

Another cable may be necessary if you want to connect a modem to your system. The type of cable required is determined by the communications interface you are using. These cables are listed in Table C-3.

Table C-3: Modem Cables for the DSH32-B Communications Module

Cable PN	Cable Length	Interface
BC22F-XX ¹	XX=10, 25, 35, 50, 75, A0, A5, B0, B5	RS232C/V.24
BC55D-XX ¹	XX=10, 25, 35, 50, 75, A0	RS422/V.36 and RS423/V.10

¹XX=Cable length in feet: A0=100ft, A5=150ft, B0=200ft, and B5=250ft.

Table C-4 lists the cable length to baud rate relationship for each type of synchronous port interface.

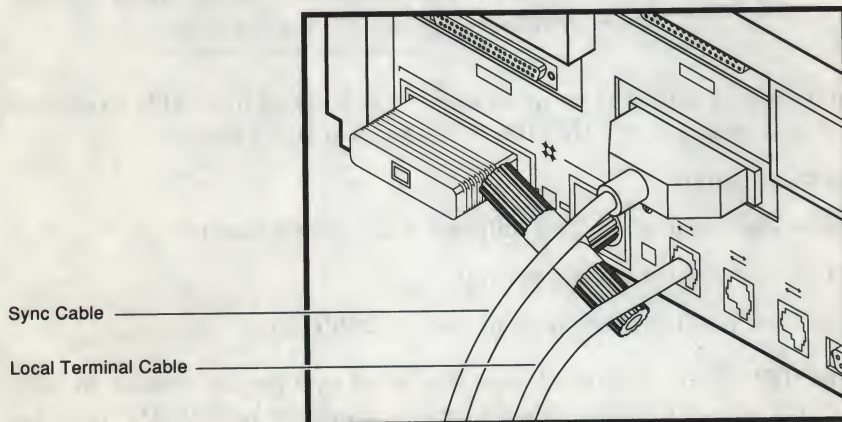
Table C-4: Cable Length to Baud Rate Relationships

Interface Type	Max. Baud Rate	Max. Cable length
RS232/V.24	19.2K	50ft. (16m.)
RS423/V.10	9.6K	1100ft. (330m.)
	19.2K	600ft. (180m.)
RS422/V.36	19.2K	4000ft. (1200m.)

The following procedure describes how to connect a modem or host computer to the synchronous port on the rear of the system unit:

1. Set the ON/OFF switches on all printers, expansion boxes, terminals, and other peripherals to the OFF (0) position.
2. Set the ON/OFF switch on the system unit to the OFF (0) position.
3. Connect the 50-pin connector of the synchronous cable to the synchronous port on the rear of the system unit. See Figure C-3.

Figure C-3: Connecting the Synchronous Line Cable to the System Unit



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4. Connect the 25-pin or 37-pin connector of the synchronous cable to the appropriate port on the host computer or modem depending on the electrical interface used.

C.3 Adding a Printer

The printers available to MicroVAX 3100 and VAXserver 3100 systems are shown in Table C-5.

Table C-5: Printers

Printer	Description
LN03	Desktop nonimpact laser printer that produces letter-quality text at 8 pages per minute.
LN03 PLUS	Enhanced LN03. Prints documents with both text and graphics.
LN03R ScriptPrinter	Nonimpact page printer that uses laser recording technology to produce high-quality output, text, graphics, and images.
LA100	Desktop dot-matrix printing terminal.
LA75	Desktop dot-matrix printer, sixel graphics.
LJ250/252 color	Desktop dot-matrix color printer, serial (LJ250) or parallel (LJ252).
LPS20	Networked PostScript printer.
LPS40	Networked PostScript printer. The LPS20 and LPS40 printers are network devices and function as independent systems (nodes) in a network.

When you order a printer, you must also order a serial line cable to connect the printer to your MicroVAX 3100 or VAXserver 3100 system.

To connect a printer:

1. Use the documentation that shipped with the printer to:

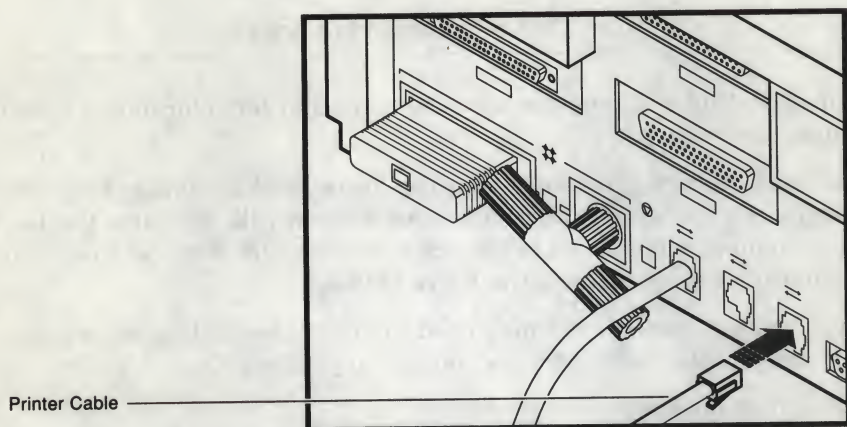
- Unpack and set up the printer.
- Set the baud rate on your printer to 9600 baud.

NOTE: *If you cannot change the baud rate on the printer to 9600 baud, you can set the baud rate of the printer port (MMJ 3) on the system unit to match the printer baud rate. The baud rate of the printer port is software programmable.*

2. Set the ON/OFF power switches on the printer and the system unit are set to the OFF (0) position.
3. Attach the larger end of the printer cable to the back of the printer.

4. Attach one end of the serial line cable to the other end of the printer cable.
5. Attach the free end of the serial line cable to the printer port (MMJ port 3) on the back of the system unit (Figure C-4).

Figure C-4: Connecting a Printer Cable to the System Unit



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C.4 Adding a Modem

A modem is a device that converts computer signals to signals that can be sent over a telephone line. Modems are typically used in large networks for wide area communications. The modems available to MicroVAX 3100 and VAXserver 3100 systems are shown in Table C-6.

NOTE: *The modem port baud rate is software programmable.*

The modem port on the back of the MicroVAX 3100 or VAXserver 3100 system unit is factory set to 9600 baud. See your modem documentation for instructions on setting the modem baud rate for communication with the system unit.

Table C-6: Modems

Modem	Description
DF242 Scholar Plus	300, 1200, and 2400 bps (bits per second) full-duplex asynchronous
DF224	300, 1200, and 2400 bps full-duplex asynchronous
DF212	300, 600, and 1200 bps full-duplex asynchronous
DF112	300 and 1200 bps full-duplex asynchronous
DF03	300 and 1200 bps full-duplex asynchronous

See your operating system software documentation for information about other supported modems.

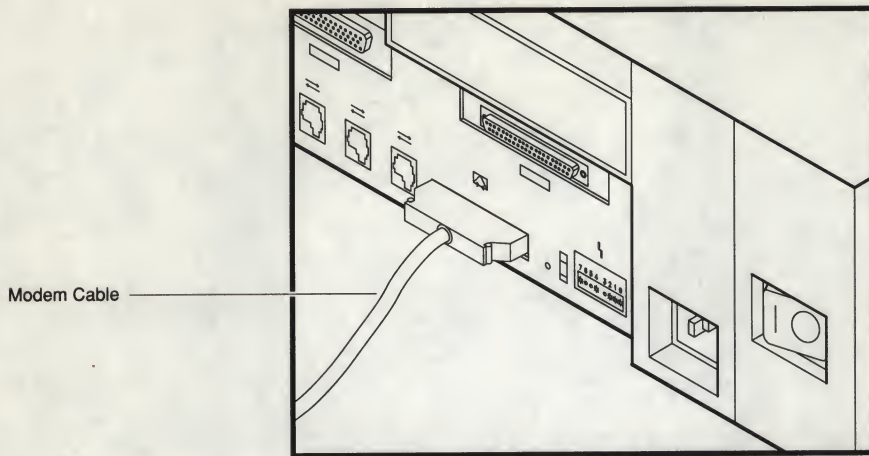
Modems must be configured such that the Force DSR attribute is not set. (By clearing the Force DSR attribute, your system will recognize the loss of modem connect, should this occur.) See your modem documentation for specific information on clearing the Force DSR option.

When you order a modem, you may need to order a serial line cable and a 25-pin D-sub adapter to connect the modem to your system.

To connect your modem:

1. Set the ON/OFF power switches on both the modem and the system unit to the OFF (0) position.
2. Follow the directions that come with your modem to set it up.
3. Use your modem guide to clear the Force DSR attribute on your modem. (By clearing the Force DSR attribute, your system will recognize the loss of modem connection, should this occur.)
4. Attach the 25-pin D-sub adapter to the back of the modem.
5. Attach one end of the serial line cable to the 25-pin D-sub adapter.
6. Attach the free end of the serial line cable to the modem port on the back of the system unit (Figure C-5).

Figure C-5: Connecting a Modem Cable to the System Unit



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C.5 Terminals

MicroVAX 3100 and VAXserver 3100 systems support VTxxx type terminals. Contact your DIGITAL sales representative for information.

TTA3:



Appendix D

System Specifications

Table D-1: System Specifications

Subject	Description
Processor	KA41-A 90ns CPU with 1 KB of first level cache
DRAM memory	4Mb, expandable to 32Mb
ROM memory	256 KB
Hard disk	Options include 1 to 5 104Mb internal hard disks ¹
Tape drive	TZ30 ¹ (if installed)
Diskette drive	RX23 ¹ (if installed)
Optional storage	RZ55, TK50Z, and RRD40 expansion boxes
Terminals	Supports the VTxxx Series
Interfaces	1 SCSI port, 1 ThinWire Ethernet port ² , 1 standard Ethernet port ² , 3 to 11 asynchronous lines, 1 asynchronous line with modem control, and 1 synchronous line with modem control
Input voltage	Automatically adjusting AC input. Range: 100-120 VAC to 220-240 VAC
Input current	Typically 1.7 A in a 110 VAC circuit; 1.0 A in a 220 VAC circuit
Power	Typically 160 W
Frequency	47 to 63 Hz

¹Depends on configuration
²Both Ethernet types cannot be used simultaneously

Table D-2: System Unit Metrics

	Weight¹	Height	Width	Depth
Model 10	11.4 kg	10.03 cm	46.38 cm	40.00 cm
	25 lb	4.07 in	18.26 in	15.75 in
Model 20	17.8 kg	14.99 cm	46.38 cm	40.00 cm
	39 lb	5.90 in	18.26 in	15.75 in

¹Depends on configuration

Table D-3: System Storage Conditions

Temperature range	5° C to 50° C (41°F to 122° F)
Relative humidity	10% to 95% at 66° C (noncondensing)
Altitude	0 to 2400 m (0 to 8000 ft)
Maximum wet bulb temperature	32° C (90° F)
Minimum dew point	2° C (36° F)

Table D-4: System Operating Conditions and Nonoperating Conditions**Operating Conditions**

Temperature range	10° C (50° F) to 32° C (90° F) with TZ30 tape drive; otherwise 10° C (50° F) to 40° C (104° F)
Temperature change rate	11° C (20° F) degree per hour maximum
Relative humidity	10% to 90% noncondensing
Maximum wet bulb temperature	28° C (82° F)
Minimum dew point	2° C (36° F)
Altitude	2400 m (8000 ft) at 36° C (96° F)

Table D-4 (Cont.): System Operating Conditions and Nonoperating Conditions

Nonoperating Conditions

Temperature range	-40° C (-40° F) to 66° C (151° F)
Relative humidity	10% to 95% at 66° C (151° F)
Altitude	4900 m (16,000 ft)
Maximum wet bulb temperature	28° C (82° F)
Minimum dew point	2° C (36° F)

Table D-5: RZ23 Hard Disk Drive Specifications

Formatted Storage Capacity	RZ23
Per drive	105Mb
Per surface	13Mb
Bytes per track	16,896
Bytes per block	512
Blocks per track	33
Blocks per drive	204,864
Spare blocks per track	1
Spare blocks per drive	6208
Performance	RZ23
Transfer rate to/from media	1.25Mb/sec
Transfer rate to/from buffer	1.25Mb/sec
Seek time track to track	≤ 8 msec
Seek time average	≤ 25 msec
Seek time maximum (full stroke)	≤ 45 msec
Average latency	8.4 msec
Rotational speed	3575 RPM ±0.1%
Start time (maximum)	20 sec
Stop time (maximum)	20 sec
Interleave	1:1
Functional Specifications	RZ23
Recording Density (bpi at ID)	23,441
Flux Density (fci at ID)	15,627
Track Density (tpi)	1150
Tracks/Surface	776
R/W Heads	8
Disks	8
Time to Process ECC (512 Bytes)	<100 msec

Table D-6: TZ30 Tape Drive

Subject	Description
Mode of operation	Streaming
Media	12.77 mm (½ in) unformatted magnetic tape
Bit density	2624 B/cm (6667 B/in)
Number of tracks	22
Transfer rate (at host)	62.5 Kbyte per second
Tape speed	190 cm/s (75 in/s)
Track format	Multiple track serpentine recording
Cartridge capacity	95M bytes, formatted (approx.)

Table D-7: RX23 Diskette Drive Specifications

Subject	Description
Diskette size	9 cm (3.5 in)
Diskettes/diskette drive	1
Data capacity	1.4Mb (RX23K)
Track density	135 TPI
Storage capacity (high density)	600Kb

Appendix E

Associated Documents

For option and system hardware part numbers, consult your DIGITAL sales representative.

Not all the following documents are available in every country. Check with your DIGITAL sales representative for availability.

Table E-1: Associated Documents

Titles	Order Number
MicroVAX 3100 and VAXserver Documentation	
<i>MicroVAX 3100 and VAXserver 3100 Planning and Preparation Card</i>	EK-A0373-PC
<i>MicroVAX 3100 and VAXserver 3100 Maintenance Guide</i>	EK-A0372-MG
<i>MicroVAX 3100 and VAXserver 3100 Illustrated Parts Break-down</i>	EK-A0372-IP
PCLAN/Server 3100 Documentation	
<i>PCLAN/Server VMS 3100 Installation Guide</i>	AA-NG68A-TE
VAXstation 3100 Documentation	
<i>VAXstation 3100 VMS Installation and Operations Manual</i>	AA-MK77A-TE
Microcomputer Handbook Series	
<i>VAX Architecture Handbook</i>	EB-19580-20
<i>VAX Software Handbook</i>	EB-21812-20
<i>Microcomputer Interfaces Handbook</i>	EB-20175-20
<i>Microcomputers and Memories Handbook</i>	EB-18451-20

Table E-1 (Cont.): Associated Documents

Titles	Order Number
Printers	
<i>Installing and Using the LN03</i>	EK-0LN03-UG
<i>LN03 PLUS User Guide</i>	EK-LN03S-UG
<i>LN03R ScriptPrinter Installation Guide</i>	EK-LN03R-UG
<i>LN03R ScriptPrinter Operator Guide</i>	EK-LN03R-OG
<i>LA100 Letterwriter User Documentation Kit</i>	EK-LW100-UG
<i>Installing and Using the LA75 Companion Printer</i>	EK-OLA75-UG
<i>Installing and Using the LJ250/252 Companion Color Printer</i>	EK-LJ250-DK
RRD40 Disc Drive	
<i>RRD40 Disc Drive Owner's Manual</i>	EK-RRD40-OM
TZ30 Tape Drive	
<i>TZ30 Cartridge Tape Drive Subsystem Owner's Manual</i>	EK-OTZ30-OM
<i>TZ30 Cartridge Tape Drive Subsystem Service Manual</i>	EK-OTZ30-SM
<i>TZ30 Cartridge Tape Drive Subsystem Reference Card</i>	EK-OTZ30-RC
TK50Z Tape Drive	
<i>TK50Z Tape Drive Subsystem Owner's Manual</i>	EK-LEP05-OM
<i>TK50Z User's Guide</i>	EK-OTK50-UG
<i>TK50Z Technical Manual</i>	EK-OTK50-TM

Table E-1 (Cont.): Associated Documents

Titles	Order Number
DECconnect System	
<i>DECconnect System General Description</i>	EK-DECSY-GD
<i>DECconnect System Requirements Evaluation Workbook</i>	EK-DECSY-EG
<i>DECconnect System Installation and Verification Guide</i>	EK-DECSY-VG
<i>DECconnect System Standalone ThinWire Networks: Planning and Installation Guide</i>	EK-DECSY-TG
<i>DECconnect System Planning and Configuration Guide</i>	EK-DECSY-CG

Appendix F

Removable Storage Media

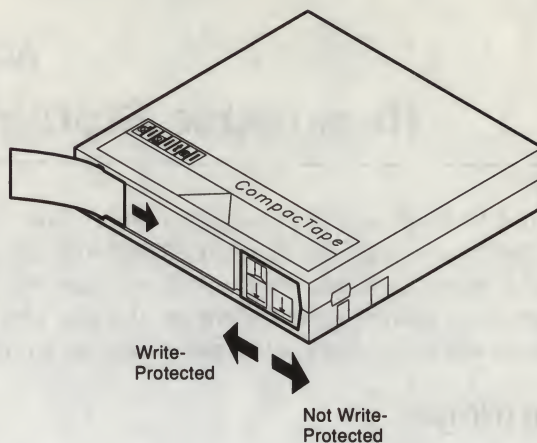
MicroVAX 3100 and VAXserver 3100 systems support the TZ30 tape drive, the TK50Z-GA tape drive expansion box, the RX23 diskette drive, and the RRD40 compact disc expansion box. All these devices use removable storage media. This appendix contains information on the use and storage of the media used by these devices: tape cartridges, diskettes and compact discs.

F.1 Tape Cartridges

The COMPACTape tape cartridge, Figure F-1, is a 10 by 10 cm (4 by 4 in) plastic cartridge that can be used by TZ30 or TK50 tape drives. The TZ30 tape drive is supplied with a COMPACTape. The COMPACTape II is the successor to the COMPACTape cartridge. The COMPACTape II is designed with tighter tolerances than the COMPACTape to support the higher recording densities of the TK70.

The TZ30 can use either COMPACTape or COMPACTape II tape cartridges to record data. The TZ30 is able to read any COMPACTape cartridge originally written by the TK50. If a COMPACTape II cartridge written by a TK70 is used on a TZ30, the TZ30 automatically unloads the tape cartridge, since the TZ30 cannot read the tape cartridge. The green LED will then blink indicating a tape error.

Figure F-1: The COMPACTape Tape Cartridge



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Table F-2 and Table F-1 shows the compatibility of CompactTape and CompactTape II tape cartridges to TZ30, TK50, and TK70 tape drives.

Table F-1: Noninitialized Cartridge Compatibility

	CompactTape (TK50-K)	CompactTape II (TK52-K)
TZ30 Drive	Yes	Yes
TK50 Drive	Yes	Yes
TK70 Drive	No	Yes

Table F-2: Initialized Cartridge Compatibility

	TK50 Drive	TK70 Drive	TZ30 Drive
TZ30 Initialized Cartridge	R/W	R	R/W
TK50 Initialized Cartridge	R/W	R	R/W
TK70 Initialized Cartridge	NC	R/W	NC

Key

R = Read Only
R/W = Read/Write
NC = Not Compatible

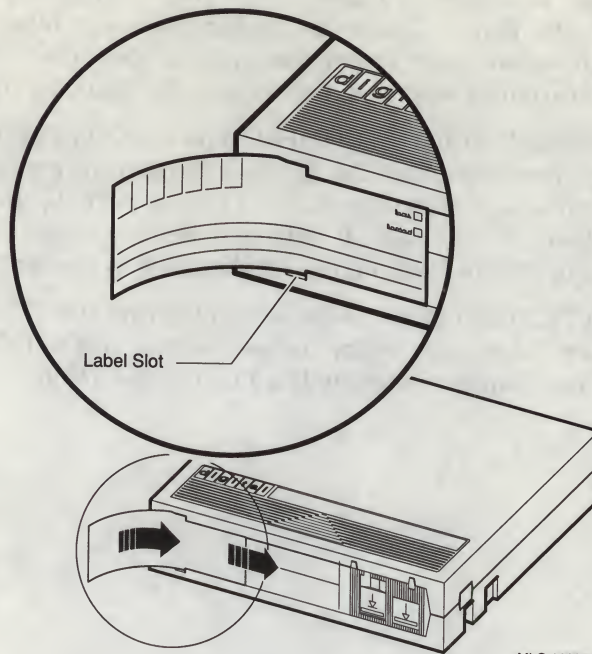
F.1.1 Labeling a Tape Cartridge

Always label tape cartridges. A slot for the label is provided on the front of the cartridge, as shown in Figure F-2. This label is visible when the cartridge is in the drive. Labels or markings on any other part of the cartridge can interfere with proper operation of the drive. Do not write directly on the cartridge with pen, pencil, or other marking medium.

The labels provided with the COMPACTape or COMPACTape II tape cartridge have spaces to check the capacity of the tape cartridge. If data was written to the tape cartridge with a TK50 or a TZ30, the 95Mb block on the label should be checked. If data was written to the tape cartridge with a TK70, the 296Mb block on the label should be checked.

If you use both TK70 and TZ30 drives, remember that the TZ30 is unable to read or write tapes that have originally been written by the TK70. However, the TK70 can read tapes written by the TZ30 or the TK50.

Figure F-2: Labeling a Tape Cartridge



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F.1.2 Writing to and Protecting Tape Cartridges

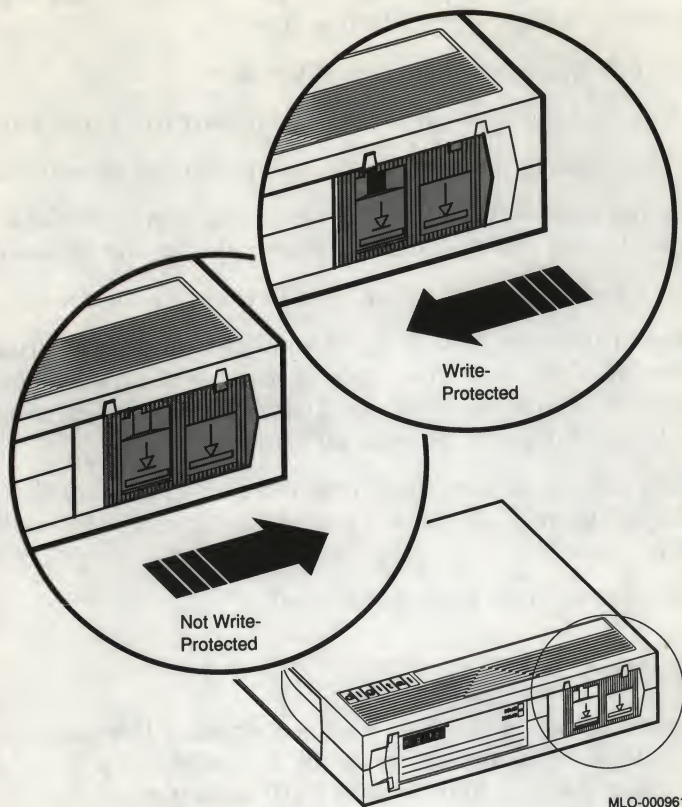
COMPACTape and COMPACTape II cartridges have a write-protect switch to prevent accidental over-write of data. Write-protecting a tape prevents accidental erasure of information. The system can read information on the tape regardless of the position of the write-protect switch. However, the system cannot write data to a write-protected tape.

F.1.2.1 Write-Protecting a Tape

When you use a tape to install software, set the write-protect switch on the front of the cartridge to the write-protect position.

To write protect a tape, slide the write-protect switch left toward the label until it locks in place (Figure F-3). An orange rectangle appears when the write-protect switch locks in the write-protect position.

Figure F-3: Write-Protecting a Tape



F.1.2.2 Writing to a Tape

When you use a tape to make a backup copy or to write out data, set the write-protect switch to enable writing to the tape.

To enable writing, slide the switch to the right, away from the label, until the switch locks in place.

F.1.3 Handling and Storing Tape Cartridges

Inside the cartridge, a 600-foot single reel of magnetic tape stores data. A plastic cartridge leader is at the beginning of the tape. Take the following precautions when handling and storing tapes:

- Do not touch the exposed surface of the tape.
- Avoid dropping the tape cartridge. The impact can cause damage.
- Allow tape cartridges to reach room temperature before using them.
- Write on the identification label before sliding it into the slot on the tape cartridge. Do not put the label anywhere else on the tape cartridge.
- Store tape cartridges away from dust in their plastic covers.
- Keep tape cartridges out of direct sunlight, and away from heaters and other heat sources. Store tape cartridges at an even temperature between 10°C and 40°C (50°F and 104°F). Store tape cartridges where the relative humidity is between 20% and 80%.
- Keep tape cartridges away from magnets and equipment that generate magnetic fields, such as motors, transformers, and video monitors and terminals.
- Keep tapes away from X-ray equipment.

F.2 Diskettes

Diskettes are magnetic disks that store information the same way a hard disk does, though their storage capacity is considerably less. DIGITAL recommends that you use high-density (HD) diskettes.

Keep your diskettes dry, out of extreme temperatures and direct sunlight, and away from anything that contains a magnet, such as a telephone.

CAUTION: *Do not place diskettes or magnetic media on or near your terminal. The electromagnetism from your terminal may damage diskettes by distorting or erasing the magnetic patterns.*

F.2.1 Writing to and Protecting Diskettes

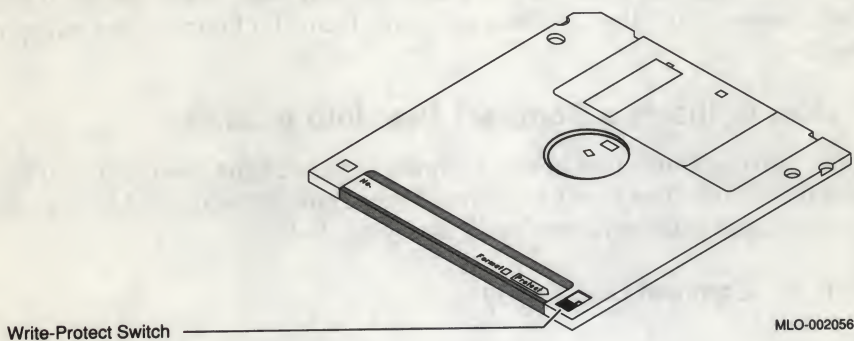
Write-protecting a diskette prevents accidental erasure of information. The RX23 diskette drive (included in some MicroVAX 3100 and VAXserver 3100 system configurations) can read information on the diskette regardless of

the position of the write-protect switch. However, the system cannot write data to a write-protected diskette.

F.2.1.1 Write-Protecting a Diskette

When you use a diskette to install application software on your system, or to protect information on the diskette, move the write-protect switch on the back of the diskette down until it locks in place as shown in Figure F-4.

Figure F-4: Write-Protecting a Diskette



F.2.1.2 Writing to a Diskette

When you use a diskette to make a backup copy of a file or to write out data, set the write-protect switch to enable writing to the diskette.

To enable writing, slide the switch up, until the switch locks in place.

F.3 Compact Discs

The RRD40 expansion box uses compact discs with a memory capacity of 600Mb. These discs are supplied in a protective caddy.

F.3.1 How to Remove the Disc from the Caddy

To remove the disc from the caddy for cleaning or caddy repair, perform the following steps:

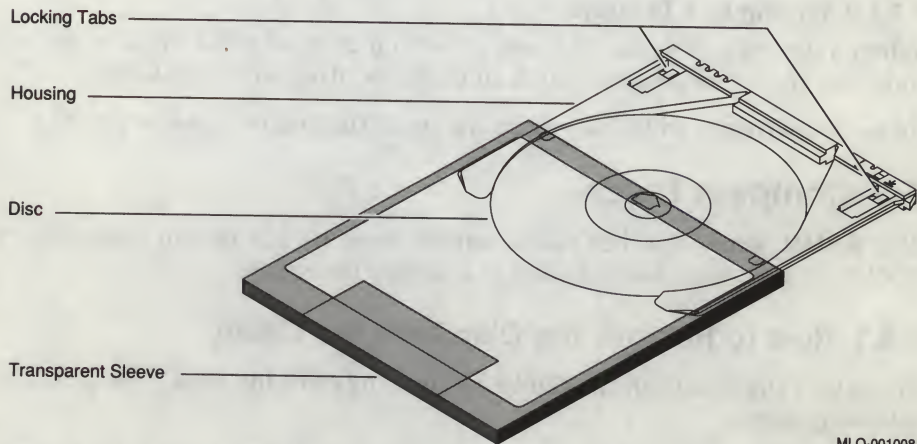
1. Hold the caddy so that it is facing label side down. Locate the locking tabs on either side of the disc housing. See Figure F-5.

2. Press down on each of the locking tabs while slightly separating the housing from the sleeve. Use your fingernail or a sharp, pointed instrument.
3. When both tabs have been disengaged, pull the disc housing out to about the midpoint of the disc.
4. Hold the disc housing on each side. Exert inward pressure on the housing so the disc will not fall out. Remove the sleeve from the housing. Place the sleeve aside.
5. Hold the disc with your free hand as shown in Figure F-6. Position your thumb on the outer edge of the disc and your index finger in the center hole of the disc. Release pressure from the housing and remove the disc.

F.3.2 How to Insert a Compact Disc Into a Caddy

A compact disc is contained inside a protective caddy for insertion into the compact disc drive. The caddy consists of three parts: the disc, the housing, and the transparent sleeve as shown in Figure F-5.

Figure F-5: Compact Disc Caddy

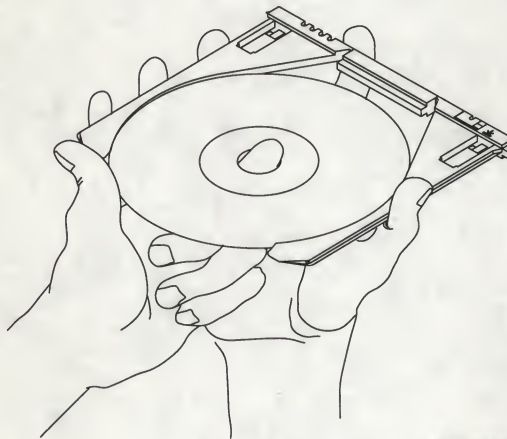


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To place a compact disc into a caddy, perform the following steps:

1. Hold the disc with your free hand. Position the housing and disc as shown in Figure F-6 (always work with the disc so the label is facing down).
2. Position your thumb on the outer edge of the disc and your index finger in the center hole of the disc.
3. Slip the disc into the housing. The inside of the housing is grooved to accept the disc. Exert inward pressure to hold the disc in the housing.

Figure F-6: Inserting a Disc in the Housing



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4. Slide the housing into the transparent sleeve until it clicks into place.
5. Turn the assembled caddy so that the label on the disc is facing up. Make sure that the notches on the housing are on the left. If the notches are not on the left when the disc is label side up, then the disc is mounted inside the caddy incorrectly. Remove the disc from the caddy and reorient it.

It is important that the disc is correctly mounted in the caddy. The compact disc drive cannot access data from a disc that is incorrectly mounted.

Appendix G

Backup Procedures

This appendix describes the following procedures:

- Installing and booting standalone BACKUP on the system disk
- Installing and booting standalone BACKUP on a TK50 tape cartridge
- Backing up and restoring the system disk

G.1 Overview of Standalone BACKUP

The Backup Utility lets you create and restore backup copies of files, directories, and user disks. Because the Backup Utility copies only what is on the disk and ignores sections of any open files contained in memory, you should use it to backup user disks, not the system disk. If you use the Backup Utility to back up the system disk, the portions of the files that were in memory and data about files not yet written back to the disk (cache) will not be recorded on the resulting backup copy.

Use standalone BACKUP to make a complete backup of the system disk. Standalone BACKUP is a version of the Backup Utility that runs without the support of the entire VMS operating system. Before you use standalone BACKUP, you must shut down the VMS operating system. The shutdown procedure sends the contents of the caches back to the disk and closes any open files. By shutting down the system and using standalone BACKUP, you can make an exact copy of the system disk.

You can keep standalone BACKUP on the system disk, a TK50 tape cartridge, or any other media that the system supports. DIGITAL recommends that you keep standalone BACKUP on the system disk and on a tape cartridge.

Usually you boot standalone BACKUP from the system disk because it saves time. You should, however, keep a copy of standalone BACKUP on a tape cartridge in case the system disk becomes damaged.

G.1.1 Installing Standalone BACKUP on System Disk

You can install standalone BACKUP in any available root directory on the system disk from [SYS1] to [SYSE]. However, DIGITAL has established [SYSE] as the standard directory for standalone BACKUP.

To install standalone BACKUP in [SYSE] on the system disk, use the following procedure:

1. Log in to the SYSTEM account.
2. Enter the following command:

```
$ @SYS$UPDATE:STABACKIT SYS$SYSDEVICE: 
```

The procedure places the files in the directories [SYSE.SYSEXEXE] and [SYSE.SYS\$LDR] on the system disk. It lists the files as they are copied. When the procedure finishes, it displays the following message:

The kit is complete.

3. To boot standalone BACKUP from the system disk, see Section G.1.2.

G.1.2 Booting Standalone BACKUP from the System Disk

To boot standalone BACKUP from the system disk, use the following procedure:

1. If the VMS operating system is not running, go to step 2.

If the VMS operating system is running, enter the following command to log into the SYSTEM account:

```
$ @SYS$SYSTEM:SHUTDOWN 
```

Answer the questions. When the procedure asks if an automatic system reboot should be performed, press RETURN for NO. When the procedure is finished, it displays the following message:

SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM

2. Stop the system by pressing the halt button on the rear of the system unit. See Figure 2-2.
3. Enter the BOOT command in the following format:

```
>>> B/E0000000 device_name 
```


Substitute the device name of the system disk for `device_name`. For example, if the system disk has a device name of DKA300, enter the following:

```
>>> B/E0000000 DKA300 
```

4. Standalone BACKUP displays a message similar to the following:

```
VAX/VMS Version V5.2 Major version id = 1 Minor version id = 0
```

5. A few minutes later the procedure asks for the date and the time. Enter the date and time using the 24-hour clock format, for example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM)  
19-APR-1990 13:00 
```

6. The procedure displays a list of the local devices on your system, for example:

```
Available device MKA500:      device type TK50  
Available device DKA100:      device type RZ23  
.  
.  
.
```

Check the list of devices. If the list is incomplete, make sure that all the devices are connected properly to the system. See Section 6.5 for details.

7. When standalone BACKUP finishes booting, it displays an identification message followed by the dollar-sign prompt (\$):

```
%BACKUP-I-IDENT, stand-alone BACKUP V5.2; the date is  
19-APR-1990 13:00:00.00  
$
```

To back up the system disk, see Section G.2.1.

To restore the system disk, see Section G.2.2

G.1.3 Installing Standalone BACKUP on a Tape Cartridge

If your system has a tape drive, DIGITAL recommends that you keep standalone BACKUP on a tape cartridge in case the system disk becomes damaged. To install standalone BACKUP on tape cartridge, use the following procedure:

NOTE: *If you have a tape cartridge distribution kit, you already have standalone BACKUP on a tape cartridge. If the original tape cartridge becomes damaged, or if you need to make extra copies, use the procedure in this section.*

1. Obtain a blank tape cartridge. Write the name on the paper label. For example, you would use the name S/A BKUP V5.2 TK50 to build a version 5.2 kit. Insert the label into the label slot.
2. Write-enable the tape cartridge.
3. Insert the tape cartridge labeled S/A BKUP V5.2 TK50 in the tape cartridge drive.
4. Log in to the SYSTEM account.
5. Enter the following command:

```
$ @SYS$UPDATE:STABACKIT 
```

6. The procedure asks for the name of the target device. Enter MKA500 for example:

```
%STABACKIT-I-SYMDEL, all global symbols deleted
Enter the name of the device on which to build the kit:
MKA500 
```

7. The procedure displays the following message:

```
.
.
.
Please place the scratch tape cartridge in drive _MKA500:
This volume will receive the volume label SYSTEM.
Enter "YES" when ready:
```

8. When you are ready to continue, type Y (for YES) and press RETURN.
9. The system displays verification messages informing you that files are being copied.
10. When standalone BACKUP is installed, the procedure displays a message similar to the following:

```
Ending time 19-APR-1990 13:45:29.90
Starting time 19-APR-1990 13:22:39.05
The kit is complete.
$
```


11. Remove the tape cartridge labeled S/A BKUP V5.2 TK50 from the tape cartridge drive.
12. Write-protect the tape cartridge and store it in a safe place.

G.1.4 Booting Standalone BACKUP from a Tape Cartridge

If the system disk containing standalone BACKUP should become unusable, you can boot standalone BACKUP from a tape cartridge. Booting standalone BACKUP from a tape cartridge takes approximately 20 minutes. You need a tape cartridge that contains standalone BACKUP (either the distribution tape cartridge or one that you created). To boot standalone BACKUP from a tape cartridge, use the following procedure:

1. If the VMS operating system is not running, go to step 2.

If the VMS operating system is running, enter the following command to log into the SYSTEM account:

```
$ @SYS$SYSTEM:SHUTDOWN 
```

Answer the questions. When the procedure asks if an automatic system reboot should be performed, press RETURN for NO. When the procedure is finished, it displays the following message:

```
SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM
```

2. Stop the system by pressing the halt button on the rear of the system unit. See Figure 2-2.
3. Insert the tape cartridge containing standalone BACKUP in the tape cartridge drive.
4. To BOOT standalone BACKUP, enter the following command at the console prompt (>>>):

```
>>> B MKA500 
```

5. Standalone BACKUP displays a message similar to the following:

```
VAX/VMS Version V5.2 Major version id = 1 Minor version id = 0
```

6. The procedure asks for the date and the time. Enter the date and time using the 24-hour clock format, for example:

```
PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM)  
19-APR-1990 13:00 
```

7. The procedure displays a list of the local devices on your system, for example:

```
Available device MKA500:      device type TK50  
Available device DKA100:      device type RZ23  
.  
.  
.
```

8. When standalone BACKUP finishes booting, it displays an identification message followed by the dollar-sign prompt (\$):

```
%BACKUP-I-IDENT, stand-alone BACKUP V5.2; the date is  
19-APR-1990 13:00:00.00  
$
```

9. Remove the tape cartridge containing standalone BACKUP from the tape cartridge drive.

To back up the system disk, see Section G.2.1.

To restore the system disk, see Section G.2.2

G.2 Backing Up the System Disk

There are several reasons to back up a system disk:

- In case a problem occurs during a VMS upgrade or update, or during the installation of other software products. *Before* you attempt any of these procedures, you should back up the system disk. If a problem occurs, you can restore the backup copy of the system disk.
- To prevent loss of system files if they are deleted accidentally. *After* you install or upgrade the VMS operating system, or any other software products, you should back up the system disk. If a system file is deleted and renders the system disk inoperable, you can restore the backup copy and continue to use the system.
- In case the system disk malfunctions. If you have a backup copy of the VMS operating system, you can restore it to a functioning disk and continue to use the system.
- To eliminate disk fragmentation. Fragmentation happens when files are not stored contiguously on the disk. Back up the system disk to a tape cartridge, diskettes, or another disk. Then restore the files to the original system disk. The BACKUP command creates a copy on which files are stored contiguously.

DIGITAL recommends that you use standalone BACKUP, which uses a subset of Backup Utility qualifiers, to back up and restore the system disk. It is especially important that you understand the functions of the /IMAGE and /PHYSICAL qualifiers to the BACKUP command before using standalone BACKUP.

Table G-1: Standalone BACKUP Qualifiers

Qualifier	Function
/IMAGE	Allows you create a functionally equivalent copy of the entire system disk
/PHYSICAL	Copies, saves, restores, or compares the entire system disk in terms of logical blocks, ignoring any file structure

For a complete description of the Backup Utility and its qualifiers, see the *VMS Backup Utility Manual*.

G.2.1 Backing Up the System Disk

To back up the system disk, use the following procedure:

1. Decide whether you want to back up the system to another fixed disk or to a tape cartridge. If you are using a tape cartridge, obtain a scratch tape that you can use for the backup copy. A scratch tape cartridge is a tape cartridge that is either blank or contains files that you no longer need.
2. If you are using a tape cartridge, write-enable it. To write-enable a tape-cartridge, slide the write-protect switch away from the tape cartridge label. Insert the tape cartridge in the tape cartridge drive.
3. Determine the device name of the drive holding the system disk and the drive holding the backup disk or tape cartridge. Enter the show device command at the console prompt (>>>).
4. Boot standalone BACKUP as described in Section G.1.2 or Section G.1.4.
5. Enter the BACKUP command in one of the following formats:

```
$ BACKUP/IMAGE/VERIFY source_drive: target_drive: Return
```

```
$ BACKUP/IMAGE/VERIFY source_drive: target_drive:- Return  
-$ saveset.BCK/LABEL=volume_label/REWIND Return
```

where:

- `source_drive` is the location of the files that you want to back up. Use the device name of the drive holding the system disk.
- `target_drive` is the destination. Use the device name of the drive holding the backup disk or tape cartridge.
- `saveset.BCK` is the name of the saveset (the name should reflect the contents of the backup tape and cannot exceed 17 characters in length).
- `volume_label` is the volume label of the tape cartridge in the tape drive. If the tape has been initialized already, use the same volume label that was assigned by the `INITIALIZE` command. If the tape has not been initialized, you can assign a volume label at this time. The volume label cannot have more than six characters.

The following example uses the `BACKUP` command to make a backup disk. You can use a backup disk as the system disk:

```
$ BACKUP/IMAGE/VERIFY DKA300: DKA200 [Return]
```

The following example uses the `BACKUP` command to make a backup tape cartridge. The contents of the backup tape cartridge must be restored to a disk before you can use them. For more information, see Section G.2.2.

```
$ BACKUP/IMAGE/VERIFY/BUFFER_COUNT=5 DKA300: MKA500:- [Return]
-$ APR_19_1990.BCK/LABEL=19APRF/REWIND [Return]
```

6. The procedure displays the following message:

```
%BACKUP-I-STARTVVERIFY, starting verification pass
```

7. If you are backing up the system disk to another disk, proceed to step 8.

If you are backing up your system disk to a tape cartridge and the contents of the system disk fit on one tape cartridge, remove the backup tape cartridge from the drive. Label the tape `COMPLETE SYSTEM BACKUP`, number it, and include the date. Proceed to step 8.

If you are backing up your system disk to a tape cartridge and the system disk contains more data than one tape cartridge can store, the procedure displays the following messages:

%BACKUP-I-RESUME, Resuming operation on volume 2
%BACKUP-I-READYWRITE, Mount volume 2 on _MUXX: for writing
Enter "YES" when ready:

Do the following:

- a. Remove the backup tape cartridge from the drive.
- b. Label the tape COMPLETE SYSTEM BACKUP, number it, and include the date.
- c. Write-protect the tape cartridge.
- d. Write-enable another scratch tape cartridge and insert it in the drive.
- e. When you are ready to continue, type Y (for YES) and press RETURN. The procedure displays the following message:

%BACKUP-I-STARTVERIFY, starting verification pass

Each time the procedure displays a mount request, follow steps a through e.

8. When the procedure is finished, it displays the following message:

%BACKUP-I-PROCDONE, operation completed. Processing finished at
19-APR-1990 15:00:00.00

If you do not want to perform another standalone BACKUP operation,
use the console to halt the system.

If you do not want to perform another standalone BACKUP operation,
ensure the standalone application volume is online and ready.
Enter "YES" to continue:

9. Press the Halt button

10. Reboot the system.

Store the backup tape cartridge in a safe place.

NOTE: The BACKUP command creates a system disk that includes a DIGITAL-provided set of volume parameters, including a CLUSTER_SIZE (disk access scheme) of value 1. (The CLUSTER_SIZE parameter refers to the way files are stored on the disk, NOT to VAXcluster environments.) You can change most volume parameters later with the SET VOLUME command. However, to change the CLUSTER_SIZE parameter, you must back up the system disk that has been initialized previously with the CLUSTER_SIZE value that you want. To prevent the BACKUP command

from reinitializing the target disk, use the /NOINITIALIZE qualifier. For more information about initializing a disk, see the Guide to Maintaining a VMS System. For more information on the BACKUP command, see the VMS Backup Utility Manual.

G.2.2 Restoring the System Disk

To restore the system disk from a tape cartridge, use the following procedure:

1. Determine the device names of the drive holding the system disk and the drive holding the backup disk or tape cartridge. Enter the SHOW DEVICE command at the console prompt (>>>).
2. Boot standalone backup as described in Section G.1.2 or Section G.1.4.
3. If you have a backup tape cartridge make sure it is write-protected. Insert it in the drive.
4. Enter the BACKUP command in one of the following formats:

```
$ BACKUP/IMAGE/VERIFY source_drive: target_drive: 
```

```
$ BACKUP/IMAGE/VERIFY/BUFFER_COUNT=5 source_drive:- 
```

```
-$ saveset.BCK/REWIND target_drive: 
```

where:

- source_drive is the location of the files that you want to restore. Use the device name of the drive holding the backup disk or tape cartridge.
- target_drive is the destination. Use the device name of the drive holding the system disk.
- saveset.BCK is the name of the saveset, if you have a backup tape cartridge.

```
$ BACKUP/IMAGE/VERIFY DKA200: DKA300: 
```

The following example uses the BACKUP command to restore the system disk from a backup tape cartridge:

```
$ BACKUP/IMAGE/VERIFY/BUFFER COUNT=5- 
```

```
-$ MKA500:APR_19_1990.BCK/REWIND DKA300: 
```


5. The procedure displays the following message:

%BACKUP-I-STARTVVERIFY, starting verification pass

If a backup disk or only one backup tape, proceed to step 8.

6. If you have more than one backup tape cartridge, the procedure displays the following message:

%BACKUP-I-RESUME, Resuming operation on volume 2

%BACKUP-I-READYWRITE, Mount volume 2 on _MUXX: for reading

Enter "YES" when ready:

Remove the backup tape cartridge from the drive. Insert the next backup tape cartridge in the drive, type Y (for YES) and press RETURN. Each time you receive a mount request, repeat this step.

7. When the procedure is finished, it displays the following message:

%BACKUP-I-PROCDONE, operation completed.

Processing finished at 19-APR-1990 15:00:00.00

If you do not want to perform another standalone BACKUP operation, use the console to halt the system.

If you do not want to perform another standalone BACKUP operation, ensure the standalone application volume is online and ready.

Enter "YES" to continue:

8. Press the Halt button.
9. Reboot the system.

1. The first part of the report is a general
description of the project and its objectives.
It includes a brief history of the project and
a statement of the purpose of the study.

2. The second part of the report is a detailed
description of the methodology used in the study.
It includes a description of the data collection
methods and the statistical analysis used.

3. The third part of the report is a discussion
of the results of the study. It includes a
summary of the findings and a comparison of the
results with previous studies.

4. The fourth part of the report is a conclusion
and a list of references. It includes a summary
of the main findings and a list of the sources
used in the study.

5. The fifth part of the report is an appendix
which contains additional information related to
the study. It includes a list of the data
collected and a list of the statistical tests
used.

Appendix H

Removing Unwanted VMS Files

H.1 Using VMSTAILOR

Read this appendix if you want to remove the VMS operating system and DECwindows files that you do not need from the system disk. For example, if you are not running DECnet-VAX, you do not need the network support files. You can remove unwanted files with the VMSTAILOR program. Enter the following command to log into the SYSTEM account:

```
$ RUN SYS$UPDATE:VMSTAILOR 
```

The VMSTAILOR program asks you if you want to tailor files ON or OFF. Type OFF to remove unwanted files.

The VMSTAILOR program lists each group of files and its size in blocks. Files are grouped according to their function. For example, all the files required for cluster support are in one group. A file group is made up of many small subgroups. You can eliminate an entire group of files, or you can eliminate one or more of its subgroups.

Decide which file groups or subgroups you do not need to support your system. The VMSTAILOR program displays step-by-step instructions that are easy to follow.

VMSTAILOR displays the names of the files it deletes. After it finishes, AUTOGEN runs automatically to make the adjustments that are necessary after system files are deleted.

NOTE: *You can use VMSTAILOR at any time to delete or add groups of VMS files to the system disk. After adding files to the system disk, you should apply any updates that affect them.*

For example, suppose you do not need the VMS Version 5.0 MAIL utility and you run VMSTAILOR to remove those files. Later on, if you decide you want to use mail, you can run VMSTAILOR to return the MAIL files to the system disk. You then apply any VMS upgrade or update that has

occurred since Version 5.0 that affected the MAIL utility. To remove VMS DECwindows files from the system disk, enter the following command:

\$ RUN SYS\$UPDATE:DECW\$TAILOR

The DECW\$TAILOR program works just like the VMSTAILOR program.

Glossary

32-bit

The length of the internal data path of the CPU.

802.3

An Institute of Electrical and Electronics Engineers (IEEE) standard describing the physical and data link layers of a local area network based on bus topology and Carrier Sense Multiple Access/Collision Detect (CSMA/CD).

application program

A program, such as a financial spreadsheet program, that performs an end-user task.

ASCII

American Standard Code for Information Interchange. A set of 7- or 8-bit binary numbers representing the alphabet, punctuation, numerals, and other special symbols used in text representation and communications protocol.

backup copy

A copy of data stored on your disk.

backup process

The process of making copies of the data stored on your disk so that you can recover that data after an accidental loss. You make backup copies on tape cartridges or on another disk.

barrel connector

A female connector for connecting two sections of ThinWire cable.

baud rate

The speed at which signals are serially transmitted along a communications line. One baud equals one bit/second.

binary

A number system that uses two digits: 0 and 1. They are represented in system circuitry by two voltage levels, and programs are executed in binary form.

bit

A binary digit; the smallest unit of information in a binary system of notation, designated as a 0 or a 1.

boot

See bootstrap.

boot device

The device that is booted at system startup. (See bootstrap and device.)

bootable medium

A fixed disk or magnetic tape cartridge containing software (such as an operating system) a bootstrap program can load into the system memory and execute.

boot node

The management center for the cluster and its major resource provider.

bootstrap (or boot)

To boot is when an internal program attempts to load the operating system software from a mass storage device.

BOT

Beginning of tape.

bus

A channel (a set of wires) along which communication signals in a computer system travel.

byte

A group of eight binary digits (bits). A byte is one-quarter of a VAX system longword.

caddy

The holder for inserting a compact disc into a compact disc drive.

cartridge insert/release lever

This lever sets internal TZ30 mechanisms to accept or eject the tape cartridge. Move the lever to the left to insert a tape, move to the right so the tape can be used, and move to the left again to eject the cartridge after the tape has been completely rewound.

cartridge leader

A plastic leader at the beginning of magnetic tape.

central processing unit (CPU)

The part of the system that controls the interpretation and execution of instructions.

cluster

A group of computers networked together that share disk storage, application programs, and other computer resources. Also called a VAXcluster.

coaxial cable

A 2-conductor, concentric, constant impedance transmission cable.

communications line

A cable along which electrical signals are transmitted. Devices or systems that are connected by a communications line can share information and resources.

computer system

A combination of system hardware, software, and external devices that performs operations and tasks.

console mode

The state in which the computer is controlled from the console terminal. Your system can be put in console mode by pressing the halt button on the rear panel of the system unit. Console mode is indicated by the console prompt (>>>) on the monitor screen. (Compare to program mode.)

console prompt

A prompt used for communication between the system manager and the computer.

controller

A system component, usually a printed circuit board, that regulates the operation of one or more peripheral devices.

CPU

Abbreviation for central processing unit. (See central processing unit.)

daisy-chain

A group of systems linked together sequentially.

data

A formal representation of information suitable for communication, interpretation, and processing by humans or computers.

data transmission

The movement of data in the form of electrical signals along a communications line.

debug

To detect, locate, and correct errors (bugs) in hardware or software.

DECconnect

DIGITAL's simple, cost-effective cabling system for extending Ethernet and terminal interconnections into offices and work areas.

DECconnect faceplate

See faceplate.

DECnet

DIGITAL networking software that runs on nodes in both local and wide-area networks.

default

A value or setting that in most cases is "normal" or "expected".

DELNI

A local network interconnect product that provides eight separate network interfaces from a single transceiver trap.

DEMPR

A multiport repeater that provides eight ThinWire Ethernet drops from a single standard Ethernet connection.

device

The general name for any unit connected to the system that is capable of receiving, storing, or transmitting data. (See *input/output (I/O) device and controller*.)

device icon

An icon on the back of the system unit that shows the device that can be plugged into the connector.

device name

The name by which a device or controller is identified in the system.

diagnostics

Programs, located in read-only memory, that detect and identify abnormal system hardware operation. (See read-only memory.)

disk

A flat circular plate with a coating on which data is magnetically stored in concentric circles (tracks). A disk resides permanently inside a disk drive, while a diskette is removable.

disk drive

A device that holds a disk. The drive contains mechanical components that spin the disk and move the read/write heads that store and read information on the surface of the disk.

disk server

A hardware system designed to provide operating system and data storage for other users.

down-line load

To send a copy of a system image or other file over a communications line to the memory of a target node.

drive leader

A plastic leader inside the TZ30 tape drive. The cartridge leader on the magnetic tape and the drive leader on the tape drive mate. The drive leader draws the magnetic tape out of the tape cartridge and onto a take-up reel inside the drive. As the tape is wound onto the take-up reel, it passes the magnetic read and write heads.

error message

A message displayed by a system to indicate a mistake or malfunction.

Ethernet

A type of local area network based on Carrier Sense Multiple Access with Collision Detection (CSMA/CD).

faceplate

A wall receptacle that provides a single network connection for your system.

file

A collection of related information treated by the system as a single unit.

format

To prepare a diskette to accept data.

formatted data

Data that is structured in a particular pattern to be understood by the system software.

ground

A voltage reference point in a system that has a zero voltage potential.

hard disk

A hard disk resides permanently inside a disk drive.

hardware

The physical components—mechanical and electrical—that make up a system. (Compare to Software.)

head

The part of a fixed disk drive, diskette drive, or tape drive that reads, records, and erases data. Also called read/write head.

IEEE

Institute of Electrical and Electronics Engineers.

I/O

Abbreviation for input/output. (See input/output (I/O) device.)

icon

A graphic symbol that gives a visual image of a device or a procedure's function.

input/output (I/O) device

A piece of equipment that accepts data for transmission to (input) and from (output) the system. For example, a terminal.

LED

Light-emitting diode. LEDs are used as indicators on the system enclosure.

link

A communications path between two nodes. A physical link is the electrical connection between two nodes. A logical link implies that two nodes are able to communicate whether or not they have a direct physical link.

load

To copy software (usually from a peripheral device) to memory. To physically place a disk in a disk drive or a tape in a tape drive.

load device

The drive that holds the distribution media during software installation.

Local Area Network (LAN)

A high-speed communications network that covers a limited geographical area, such as a section of a building, an entire building, or a cluster of buildings. It is a privately owned communication network whose speed is upward of 1 megabit-per-second.

Local Area VAXcluster (LAVc)

A group of two or more computers connected by an Ethernet cable or computer-interconnect. In a LAVc, one computer serves the other computers; it is required to start the other computers and manage the resources that they share.

logical link

Two nodes are able to communicate by means of software whether or not they have a direct physical link.

magnetic tape

A tape used for storing data that is made of plastic and coated with magnetic oxide. Also called magtape.

megabyte

1,048,576 (2^{20}) bytes.

memory

The area of the system that electrically stores instructions and data, often temporarily.

memory module

A printed circuit board that contains additional memory for the system.

module

A printed circuit board that contains electrical components and electrically conductive pathways between components. A module stores data or memory or controls the functions of a device.

multiport repeater

A repeater used to connect two or more cable segments. The repeater lets you extend Ethernet networks beyond the limits imposed by a single segment. Repeaters perform the basic actions of restoring signal amplitude, waveform, and timing amplitude to normal data and collision signals.

multisegment LAN

A LAN composed of more than one cable segment.

network

A group of individual computer systems that are connected by communications lines to share information and resources.

network coordinator

The network coordinator manages the network, assigns unique node names and addresses for each system on the network, and provides administrative assistance to network users.

node

An individual information-processing unit, such as a computer, workstation, or peripheral device, that is connected to a network. A node is an end point to any branch of a network or a junction common to two or more branches.

operating system

A collection of system programs that controls the operation of the system and allows the user access to data files, input/output devices, and applications programs. The operating system software performs such tasks as assigning memory to programs and data, processing requests, and scheduling jobs. VMS and ULTRIX are the two operating systems available for the MicroVAX 3100 and VAXserver 3100 systems.

output device

A device that accepts data from the system. A printer is an example of an output device.

peripheral device

A device that provides the CPU with additional memory storage or communication capability. Examples are disk and diskette drives, video terminals, and printers.

port

The name of the socket or connector at the back of the computer to which a terminal, printer, or other communication devices are connected.

power-up sequence (power up)

A series of ordered events that occur when you supply power by turning on the system.

printer

A peripheral device that provides paper copies of information stored on the system.

program

The sequence of instructions the system uses to perform a task. (See software.)

program mode

The state in which the computer is controlled by the operating system. After the operating system is installed, the system will always operate in program mode, unless you put it into console mode. (See console mode.)

prompt

Words or characters that the system displays to indicate that it is waiting for you to enter a command.

RAM

Abbreviation for random-access memory. (See random-access memory (RAM).)

random-access memory (RAM)

Memory that can be both read and written into and can randomly access any one location during normal operations. The type of memory the system uses to store the instructions of programs currently being run.

read-only memory (ROM)

A memory whose contents cannot be modified. The system can use the data contained in a ROM but cannot change it.

ROM

Abbreviation for read-only memory. (See read-only memory (ROM).)

run

A single continuous execution of a program (noun). To execute a program (verb).

satellite node

A node that is booted remotely from the system disk on the boot node. A computer system that obtains a specific set of services from a server system.

SCSI

See Small Computer System Interface.

section

A single length of ThinWire Ethernet cable terminated at each end with a connector.

segment

A length of cable made up of one or more cable sections connected with barrel connectors or T-connectors.

server

Hardware or software that provides a specific set of services to a satellite.

single-segment LAN

A LAN that is composed of only one coaxial cable segment. (See also section and segment.)

Small Computer System Interface (SCSI)

It is an interface designed for connecting disks and other peripheral devices to computer systems. SCSI is defined by an American National Standards Institute (ANSI) standard and is used by many computer and peripheral vendors throughout the industry.

software

Programs executed by the system to perform a chosen or required function. (Compare to Hardware.)

standard Ethernet

IEEE standard 802.3 compliant Ethernet network composed of standard Ethernet cable as opposed to ThinWire Ethernet cable.

storage medium

Any device capable of recording information; for example, a diskette.

store

To enter data into a storage device, such as a disk, or into memory.

system

A combination of system hardware, software, and peripheral devices that performs specific processing operations.

system management tasks

Tasks performed by an assigned person (usually the system manager) to operate and maintain the system.

tape drive

A device that contains mechanical components and holds, turns, reads, and writes on magnetic tape.

T-connector

Connector used to join ThinWire Ethernet cable sections. The connector also has a connector that is attached directly to a system.

TCP/IP

Transmission Control Protocol/Internet Protocol (TCP/IP) networking protocols that are standard with the ULTRIX-32 and ULTRIX-32w software.

terminal

An input/output device that lets you communicate with the system. Terminals are divided into two categories: video and hard-copy.

terminator

A connector used on one or both ends of an Ethernet segment that provides the 50-ohm termination resistance needed for the cable.

ThinWire

A DIGITAL trademark used to describe its 10 base 2 (IEEE standard 802.3 compliant) Ethernet products used for local distribution of data.

ThinWire connector

The connector on the rear of the system unit to which the ThinWire Ethernet cable is attached.

transceiver

A device that provides a single physical connection between standard Ethernet and Ethernet communication equipment.

unload switch

A switch on the front of the TZ30 tape drive that rewinds and unloads the tape.

ULTRIX-32, ULTRIX-32w

DIGITAL implementation of the UNIX operating system.

unshielded twisted-pair cable

Multiple-conductor cable whose component cables are paired, twisted, and enclosed in a single jacket.

user input device

A piece of equipment that is used to transfer data to the system. For example, keyboard, disk, tape, and system are input devices.

VAXcluster

A group of two or more computers connected by an Ethernet cable. In a VAXcluster, one computer serves the other computers: it is required to start the other computers, and manages the resources that they share.

video terminal

A terminal that displays information on the screen of a cathode ray tube (CRT).

VMS

DIGITAL's proprietary operating system.

write-protect

To protect a disk, diskette, or other storage medium from the addition, revision, or deletion of information.

write-protect switch

The switch that you slide down on a CompacTape and CompacTape II cartridge to prevent loss of data by accidental overwriting.

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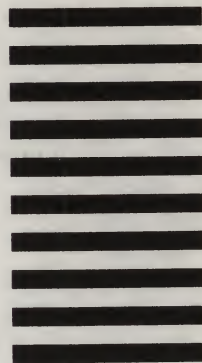
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